VOLUME LXVIII JANUARY, 1912 No. 3

AMERICAN JOURNAL OF INSANITY

A COMPARISON OF PERSONAL CHARACTERISTICS IN DEMENTIA PRÆCOX AND MANIC-DEPRESSIVE PSYCHOSIS.

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By some psychiatrists stress has lately been laid on the personal characteristics and make-up of patients in the pre-psychotic period as either predisposing or dynamic causes of the later psychosis, especially in dementia præcox. This study was undertaken as a preliminary test of the probable validity of these views, and for its possible value in suggesting the direction of further work. Fifty cases of dementia præcox have been compared in detail with fifty cases of manic-depressive psychosis; only those traits are considered which described the patient before the symptoms of the psychosis appeared. Roughly speaking, the histories were written by the same men over the same period of time, and on the whole were fairly full, though some were scanty. There appeared to us to be no doubt about the diagnosis of the cases finally included.

A list of fifty undoubted cases of dementia præcox, all personally observed by one or both of us, was made out; then the histories were looked up and the traits listed. Similarly fifty cases of manic-depressive psychosis were selected out of a larger number. In the final list only those cases were kept in which there was some characterization, however slight.

Table I shows the characterizations arranged in two groups, one showing such traits as would not be apt to hinder the patient in his adjustments to life, the other such as might more probably lead or develop into inadequate or more or less harmful adjustments. This division is not along the line of any particular *group* of traits such as would make the "shut-in personality" or any

other special personality. The words given are in almost every instance direct quotations from the giver of the history. There are the following exceptions; under "social" were included "sociable," "socially inclined," "had many friends"; under "excellent scholar" were grouped "head of class," "prize scholar," "valedictorian," "excellent student"; and under "average scholar," were put a number of expressions for fair or average work at school.

TABLE I.—INDIVIDUAL TRAITS.

A. Harmless	D. P.	M.-D.	B. Possibly Harmful.	D. P.	M.-D.
Social	6	13	Seclusive	5	1
Happy, cheerful, jolly	9	7	Sensitive	6	5
Popular, well liked	3	4	Hypersensitive	..	1
Bright, vivacious, lively	11	8	Shy, retiring	2	4
Witty, humorous	..	3	Self-conscious	..	2
Entertaining	1	..	Introspective	..	1
Sanguine	1	..	Over-conscientious	1	5
Optimistic	1	..	Not social	..	3
Disposition good, even	..	3	Self-willed, wilful	2	2
Disposition sweet	1	..	Not popular	..	1
Disposition kind	..	2	Secretive	1	..
Normal, natural	9	6	Reticent	5	2
Normal interests	..	2	Unconfiding	5	2
Normal recreations	..	1	Taciturn	1	..
Character good	..	1	Suspicious	2	..
Habits good	3	3	Reserved	1	..
Judgment good	..	2	Nervous	2	7
Average scholar	6	9	Excitable	..	1
Good education	..	2	Jealous	..	1
Good student	9	..	Highstrung	..	1
Excellent scholar	..	8	Conceited	1	..
Learns easily or well, quick to learn	4	..	Easily angered	1	1
			Easily frightened	..	2
Successful	..	6	Easily worried	1	..
Industrious, energetic	4	7	Easily offended	2	..
Capable	..	2	Dependent	..	2
Business ability	..	2	Unsuccessful	..	3
Determined	..	1	Morbid	..	1
Positive	2	3	Effeminate (man)	..	1
Self-confident	..	1	Precocious	4	1
Highly esteemed	..	1	Slow in learning to talk	..	1
Highly trusted	..	1	Subject to blues and moods	..	2
Methodical	1	1	Looks on dark side	..	1
Thorough	1	1	Fussy	..	1
Refined	1	1			

A. Harmless	D.	P.	M.-D.
Generous	1		..
Serious	1		..
Enthusiastic	2		..
Quiet and sedate	4		2
Ambitious	4		3
Interested	..		1
Cultured	..		2
Conscientious	..		4
Slow	..		1
Philosophical	..		1
Unselfish	..		2
Considerate	..		1
Leader, ruler of men	..		2
Deacon	..		2
Excellent teacher	..		1
Never intemperate	..		1
Never cross	..		1
Never eccentric	1		..
Not nervous or excitable	..		2
Not morbid	..		2
Not introspective	..		1
Intense at work	..		1
Fond of reading	..		4
Great memory	..		1
Trusting	1		..
Unsophisticated	1		..
Self-dependent	1		..
Nothing noteworthy	1		..
Amiable	2		..
High minded	1		..
Gentlemanly	1		..
Prefers company of elders	1		..
Literary	1		..
Health normal or good, well, healthy, strong	14		15
Rugged, vigorous, robust, full of energy	3		2
Health excellent, never sick	..		2
Active	3		8
Athletic	1		1
Fond of outdoor games	3		..
	120		164

B. Possibly Harmful.	D.	P.	M.-D.
Finicky	1		..
Excessive smoker	..		1
Different	2		..
Dissipated	1		..
Erotic, masturbation	4		3
Sexual worries	..		2
Bad dreams	..		2
Set in ways	2		..
Luxurious	..		1
Expects indulgence	..		2
Of strong will	..		2
Fond of music, artistic	5		3
Religous	2		4
Idealist, faddist	1		..
Lied	..		1
Not persistent	..		2
Little moral sense	..		1
Ill-balanced	..		1
Restless	1		1
Prefers sad music	1		..
Thoughtless	..		1
Poor at sports	..		2
Poor at school	2		2
Peculiar, odd	7		..
Sympathetic	1		..
Intense	1		..
Indifferent	1		..
Obstinate	1		..
Imaginative	1		..
Unhappy	1		..
Tends to fixed ideas	1		..
Tender-hearted	1		..
Poetic	1		..
Inventive	1		..
Health fairly good	..		5
Easily tired, delicate, weak, not strong	12		6
Always ailing	..		1
Frequent headache	...		2
Slight build	3		2
Hypochondriacal	..		1
Nervous dyspepsia	..		1
Sickly as a child	2		..
	98		104

In this table certain traits occur often, or are more marked in one disease than in the other. Those noticeable for either reason are:

	D. P.	M.-D.
Social	6	13
Happy, bright, witty, humorous	20	18
Normal	9	9
Good education or average scholarship	19	19
Successful, industrious, capable, business ability, deacon, leader	4	22
Conscientious or over-conscientious	1	9
Seclusive, secretive, reticent, unconfiding, taciturn, reserved	14	3
Nervous, excitable, high-strung	2	9
Precocious	4	1
Different, peculiar, odd	9	0
Sexual abnormalities	4	5
Sensitive, hypersensitive	6	6
Healthy	14	15
Active, athletic	7	9
Health fairly good, not well or strong	17	18

Summing our results so far, we find some terms used often and applied impartially in both diseases. These are:

	D. P.	M.-D.
Happy	19	18
Normal	9	9
Average education	19	19
Sexual abnormalities	4	5
Sensitive	6	6
Healthy	14	15
Active	7	9
Health fair or poor	17	18

Again, other terms are applied with greater frequency to the manic-depressive cases. These are:

	D. P.	M.-D.
Social	6	13
Successful, etc	4	23
Conscientious, etc.	1	9
Nervous	2	9

And again, some are applied with greater frequency to dementia præcox. These are:

	D. P.	M.-D.
Reticent etc.	14	3
Peculiar, etc.	9	0
Precocious	4	1

Up to this point, *traits* have been considered regardless of their *grouping* in the individual case. In Table II an attempt was made to view the same material from another angle by a classification which considered the personalities as units. Under one heading (normal) were put those cases that were described entirely, or with one exception of minor importance, by the terms found in Column A of Table I. Under another heading (normal—mixed) were placed the cases which showed both "harmless" and "possibly harmful" traits, but in whom it was highly probable that the latter did not dominate the personality. These two groups we have considered as normal or at least not abnormal.

The other headings (abnormal) need no comment, except that with Dr. Hoch's * work in mind it was thought worth while to separate out from the general class of abnormal those who either showed a noticeable tendency toward seclusiveness or could be considered "shut-in" in the most rigid sense.

TABLE II.—PERSONALITIES.

	D. P.		M.-D.	
Normal	26		33	
Normal—mixed	8		10	
	—	34	—	43
Abnormal	6		5	
Abnormal—seclusive tendency	6		2	
Abnormal—"shut in"	4		0	
	—	16	—	7
		50		50

It can easily be seen that such a classification as that in Table II might vary according to the predilections of the classifier. For this reason, and also to give some idea of the material on which this work was based, we have appended sample descriptions of the personalities as found in several of the histories considered, together with brief diagnostic outlines of the cases.

* A Study of the Mental Make-up in the Functional Psychoses. Jour. Nerv. & Ment. Dis. Vol. 36, p. 230. Abstract.

Constitutional Factors in the Dementia Præcox Group. Rev. Neur. & Psychiat. Vol. 8, p. 463.

CONCLUSIONS.

From the foregoing data we have drawn the following conclusions, realizing that the number of cases dealt with is too small, and the data in many of the cases too meagre, to more than suggest them as tentative or probable.

1. Normal *traits* predominate in manic-depressive psychoses (164 to 120).

2. Abnormal traits are found in about an equal proportion in dementia præcox and manic-depressive psychosis (98 to 104).

3. Certain abnormal traits—reticence, peculiarity, precosity—are found in much larger proportions in dementia præcox than in manic-depressive psychosis (27 to 4).

4. Normal *personalities* are found fairly frequently in both diseases, but more frequently in manic-depressive psychosis (33 to 26).

5. Abnormal personalities are much more frequent in dementia præcox than in manic-depressive psychosis (16 to 7).

6. The "shut-in personality" or the tendency to it is found almost exclusively in dementia præcox (10 to 2).

7. If all doubtful and abnormal personalities (*i. e.*, the normal—mixed + all abnormal as in Table II) are conceded to predispose to dementia præcox, on the one hand not more than half (24 cases, 48 per cent) of the dementia præcox cases are so predisposed; and on the other, a third (17 cases, 34 per cent) of the manic-depressive cases have the same predisposition.

8. The special "shut-in personality" is found in too small proportion (20 per cent) to substaniate fully the claims made by some writers for its prevalence as an etiological factor in dementia præcox.

The study suggests three main lines of future work:

1. The gathering of fuller data as to make-up and characteristics, from several sources in each case whenever possible.

2. The making of similar comparisons of make-up in all the psychoses, but especially in the high-grade defectives and epileptics.

3. The study of characteristics and personalities as possible determinants of reaction-types or of symptoms, or as modifying the clinical picture, rather than as causes of the onset of the psychosis.

APPENDIX.

Descriptions Classified as Normal.

1. Woman, now 39, S. As a girl she was strong, energetic, active, socially inclined, had many friends and was well liked by them. She graduated from college, where she was a good scholar, editor of the school paper, and a prize scholar in declamation.

At 31, in spring of 1903, after father's death, depressed, "numb all over," lost interest, seclusive, unoccupied, had inadequacy, difficulty in deciding things; recovered in few weeks. Six months later, after death of step-mother, similar attack, recovered in few weeks. In October, 1905, after "lazy" summer, grew talkative, over-active, and soon highly exhilarated and frankly manic, distractible, flighty (but with poor, unproductive flight at first), with free motor activity, and confusion, with delirious ideas. Five similar attacks in quick succession during the year were followed by complete recovery, lasting 2-3 years. Since then she has had three typical manic attacks, with normal intervals. Now (Aug., 1911) in manic attack.

M.-D.

2. Woman, now 33, S. Educated at public and private schools up to the age of 20. She was always bright and active, and learned well. Taking up the study of music early, she progressed, was interested, stuck to it. She was always of a delicate, sensitive make-up, worried rather easily, but was not seclusive.

At 24, in 1902, after fatigue and anxiety, lost interest, grew unoccupied, depressed, had hypochondriacal ideas. Improved much to October, 1903, then absurd delusions of persecution. Since then gradual deterioration, with occasional sudden impulsive acts, hallucinations, lack of initiative, indifference, causeless laughter, irrelevance, but complete orientation. Same in Aug., 1911.

D. P.

3. Man, now 24, S. An only child; graduate of Harvard College; a very good student; interested in athletics; never considered eccentric.

At 21, in 1908, grippe, then worried about college examinations. Gradually developed "difficulty in remembering," restlessness and inefficiency; then blocking, lack of initiative, fugue, impulsive acts; a little later, apathy, indifference, scattered, irrelevant talk, catatonic positions, stereotyped acts, waxy flexibility, occasional negativism and mutism. Now, Aug., 1911, much demented.

D. P.

Descriptions Classified as Normal—Mixed.

4. Woman, now 70, M. Up to age of 20 she was inclined to be shy and retiring. Was subject to blues and moods. Since then she has had good health, has been cheerful, of even disposition, sociable, active, energetic, of strong will. After an excellent education she became one of the best teachers in Boston.

At 40, in 1881, depression, recovered in three months. At 43, milder depression, without obvious cause; recovered in 2½ months. Then occasional single days of depression, in course of active, busy, useful, public-spirited life. Menopause at 48-9. At 56, depression, with apprehension, paraesthesias, self-accusation, suicidal ideas, "her soul was lost," loss of weight, agitation, but good orientation. Recovered in 8-9 months. Since 1897 has had 7 or 8 attacks of depression, some followed by hypomanic states lasting several weeks. In the interval she is normal. Is now (Aug., 1911) recovering from a depression. M.-D.

5. Woman, now 32, S. At public school was always considered bright and quick to learn. She did not care much for the companionship of other young people, but would rather be at home reading and doing housework. She left school at 16 and has been at home since then. She has shown nothing abnormal till the present trouble.

At 24, in 1903, gradually began to grow listless and apathetic. By 1905, delusions of assault and pregnancy, poison in food, peculiar ways of eating. By 1907, limited diet, delusions of influence, seclusiveness, apathy, complete idleness, almost mutism, but no depression or retardation. Oriented. Same to Dec., 1910. D. P.

DESCRIPTIONS CLASSIFIED AS ABNORMAL.

6. Woman, now 38, S. She was considered rather precocious; was always an idealist, believing that people should live out of doors, with little or no clothing. Ready for high school at 12, she was kept out till 14; remained 2 years and then studied art creditably from 16 to 23.

At 19, in 1892, excitement for 8 months, "recovered." In 1899, nervous and excited for 4 months, then worked diligently and successfully at art. In 1905 studio burned, she grew depressed, lost interest, not well since. Since 1906 impulsive acts, stereotyped acts and positions, mannerisms, seclusiveness, apathy, frequent mutism, irrelevance, incoherence, causeless laughter, but oriented. Slowly deteriorating. Still in hospital, Aug., 1911. D. P.

7. Man, now 69, S. After graduating from Harvard entered the ministry. He was never successful and was always considered an ill-balanced man, subject to extreme fluctuations and moods.

Now (Aug., 1911) 69 years old. Since early youth subject to occasional depressions lasting 3-4 months, followed by mild exhilarations. In intervals preached, wrote, did missionary work. In 1904 exhilarated, undignified, frivolous for 2 months; then depressed, inadequate, perhaps retarded, for several months; then keyed up, buying unnecessary things, over-active, talkative, gradually improving in some 6 months; then becoming depressed, inactive, uninterested, unhappy, inadequate, self-accusatory, with slight retardation and thinking difficulty. Normal by July, 1906, till spring, 1907; then exhilarated, with long orderly flight, over-activity, euphoria, great

benevolence, very talkative, improving till nearly normal in fall of 1907, then growing rapidly depressed, with inadequacy, retardation, etc., which is his present state. M.-D.

DESCRIPTIONS CLASSIFIED AS ABNORMAL—SECLUSIVE TENDENCY.

8. Woman, now 30, S. As a child always considered bright and active, rather precocious. Always ambitious. She entered into her studies with enthusiasm, had great plans for the future along musical and art lines, wanted to become an artist and illustrate books. After her training at the high school she took up music; after a year she became tired of it and gave it up for no good reason, as she was progressing favorably. She turned to art work for 4 or 5 years; her work was considered good for an amateur, but she sold only one piece. She was very critical about her work, always claiming that it was worthless; if people praised it she became uncomfortable and said she knew that they didn't mean it. All her life she has been rather seclusive, caring for only one or two girl friends, never having a man call on her; in her manners quiet and retiring, she preferred to read at home to going out in company. She disliked housework; nothing in her life, in fact, seemed to arouse much interest. Of late years (previous to 1906) she has read rather abstruse works; was interested in history, hypnotism, psychology, etc., and seemed to be absorbed in them.

At 23, in 1904, poorly motivated fugue, followed by acute attack with senseless, incoherent talk, then apathy, idleness, negativism, ideas of "control." In 1906, sudden acts which she couldn't explain, but clear, oriented, not retarded. Then periods of mutism, negativism, causeless laughter, irrelevant replies, and ideas of influence. By September, 1907, better, but not well; same in April, 1908. D. P.

9. Man, now 43, S. Always delicate as a child. In college and on stage did only fair work. He kept by himself most of the time in spite of the efforts of his friends to have him join in with them.

At 26, in 1894, "broke down," had delusions of sexual persecution, ideas of influence, tantrums, peculiar acts "to show his manhood," and became seclusive. Gradual deterioration to present time, Aug., 1911. Now laughs without cause, is unoccupied, indifferent, seclusive, mannered stereotyped, often irrelevant, but oriented. D. P.

10. Man, now 28, S. An average scholar, graduating from the high school at 17. Very fond of music, since the age of 8 studying and playing the piano, preferring sad or melancholy pieces. His technique was good, but there was no life in his playing.

At 20, in 1903, gradually began to lose interest, grew apathetic, seclusive, less efficient, extremely fastidious. From 21 to 24 he gave music lessons, but took less interest during the latter part of this time and lost his pupils. Although he has never cared much for companions of his own age and has not had any liking for outdoor sports, during 1907 he has been more than ever seclusive and at times apathetic. Then followed catatonic seizures,

ideas of influence, at times stereotypy, mutism, waxy flexibility. Clear orientation throughout. Continues apathetic, mannered, stereotyped, with ideas of influence, to September, 1909. D. P.

11. Man, now 32, S. As a child he was full of life and energy, of an inventive and original turn of mind. At 12 he showed symptoms of appendicitis which kept him inactive and out of school at times and prevented his joining the sports of his fellows. This is thought to account for his not showing more liking for athletics and social intercourse throughout his youth. He was noted to hold himself aloof, and he sometimes excited mild wonder by his peculiarities. At 16 showed surprising originality and humor. In demeanor through youth he was rather serious and unconfiding. At 14 his father observed him to be silent while his mates gave the school cheer with boyish enthusiasm. He was correct in his habits of life, having no vicious tendencies, it is thought. He did well at his studies until the age of 18.

At 18, in 1907, difficulty with studies, then an ill-judged act for insufficient cause. Gradually more seclusive, inefficient in many kinds of inferior work, many fugues. By 1905, surly, seclusive, apathetic, unoccupied, with causeless laughter. No change, March 1909. D. P.

12. Man, now 44, S. As a schoolboy the patient was very studious, and enjoyed working hard. He cared nothing for sports or athletics, indeed took little recreation. He was taciturn and avoided social functions. Religiously inclined, he was very set in his ways and independent in his opinions. He graduated from college with high honors, and then taught school. He always found himself at a great disadvantage before an audience. A good teacher and tutor, he lost his self-control, in part at least, when strangers entered his classroom, and halted and stumbled in his speech.

At 33, in 1900, grew more seclusive, ineffective in carrying out plans, impulsive, had tantrums but "didn't know why," had hypochondriacal ideas. By 1905, apathetic, no initiative, mannered, stereotyped, irrelevant, unoccupied, with sudden impulsive, apparently causeless, outbreaks, but oriented. No better in May, 1906. D. P.

13. Man, now 37, S. A quiet, reticent boy, only fair student.

At 19, in 1893, suddenly excited, frightened, dazed, catatonic, negativistic, then depressed and reticent, Nearly well in 10 months. In 1895, mute, tube-fed, dazed, unoccupied, no spontaneity. "Perfectly well" in May, 1896. June, 1897, another attack of mutism, apathy, little occupation. In 1898, sudden impulsive violence, then suspiciousness, listlessness, little spontaneity or initiative, but oriented; since then, seclusive, almost mute, laughs to self, takes peculiar positions, is unoccupied, indifferent, lacks initiative, is disconnected in talk, irrelevant, oriented. Still in hospital, Aug., 1911. D. P.

14. Man, now 23, S. Well as a baby. He learned to talk later than the normal child; very bashful. He never did well at school; at one time he came home saying that he could not learn with people around him. He never did consistent or steady work. He went by himself, was not fond of sports, and would not join his fellows in their different interests; was never contented to stay in one place for any length of time. He was generally kindhearted, but often would do thoughtless things that would annoy his family. He was fond of novel-reading. He has smoked excessively but never used alcohol. He admits masturbation.

At 18, in 1905, excessive vanity, expensive tastes, happy, but irritable and incompetent—lasted a year. Pretty well; then, early in 1908, very despondent, inadequate, couldn't work or take interest. In three months, happy, extravagant, hilarious, impatient, irritable, without sense of responsibility, with poor judgment, inconsequential loquacity, and orderly flight. After summer, began to grow depressed, kept to himself. In spring, 1909, seemed normal, did fairly efficient work and was interested for 2 months, then exhilarated, talkative, over-active, extravagant, distractible. Improved. Did fairly efficient work in summer, then again exhilarated as before, with insight, but little self-control. Now (Aug., 1911) quieting down after nearly a year's mild manic period. M.-D.

15. Man, now 31, S. An average student and normally active, playing on the school ball team. Since 20 he has lacked interest and energy in undertaking things, has avoided athletics, has become more retiring and has limited his recreation to occasional attendence at a man's club.

At 20, in 1900, despondent, thought himself sexually underdeveloped, was self-accusatory, recovered in a year. At 26, another depression with ideas of same content, but recovered in a few months. In mid-summer, 1910, same kind of depression, with perfect clearness, slight inadequacy, slight tendency to self-accusation, ideas of sexual underdevelopment, insistently recurring depressive ideas, marked despondency. Well by June, 1911. In intervals between attacks he has been normal except for his inadequacy. M.-D.

DESCRIPTIONS CLASSIFIED AS ABNORMAL—"SHUT-IN."

16. Man, now 68, S. Always a feeble and delicate child, bashful and morbidly sensitive, but always pure and upright.

At 22, in 1865, gradual depression, then religious ideas, ineffectively occupied, little interest; later, incoherent, mannered, aimless. In hospital since 1878; now (Aug., 1911) much demented, helpless, absolutely unoccupied, apathetic, stereotyped, incoherent, partly oriented. D. P.

17. Woman, now 37, S. A rather precocious girl, very sensitive and secretive. She loved music, and all her reading was of a serious kind.

At 21, in 1895, she became languid and unoccupied, at times excitable, and has been steadily deteriorating ever since, showing increasing apathy,

refusing to bathe, and for two years refusing to speak. Brought to this hospital in 1908 in a demented condition, mute, resistive, absolutely unoccupied, laughing constantly to herself. In 1909 she began to talk gibberish and eat voraciously. No change in her condition in August, 1911. D. P.

18. Man, 32 at death, Nov., 1910, S. Never very bright; average mind; not a good student. Even before the age of 14 he was subject to fits of depression, but objectively appeared jovial and happy. Always rather shy, never caring to go out among people. He had a certain number of friends, but rather disliked meeting strangers. He has had a tendency to be suspicious. Uses tobacco to great excess.

At 27, in 1905, grew more seclusive, In 1906 hallucinated, had delusions of reference, was suspicious, apprehensive, bewildered for a time, then clear, coherent, but apathetic, with ideas of influence and of his mind being used. Grew more and more idle, indifferent, at times negativistic, became rather stereotyped, laughed to himself; deteriorated till he died of cancer. Oriented throughout. D. P.

19. Man, now 29, S. Even from a child different from his brothers, who were more quiet and even, while he has always been excitable and easily angered. He usually preferred reading to baseball. He did ordinarily good work in common and high schools, but did not do well at Andover. His disposition has been decidedly retiring, reticent and oversensitive. In July, 1899, he had typhoid fever. From 1899 to 1902 he was more sensitive than usual and more seclusive, but took some interest in his studies and was ambitious to go to college.

At 20, 1902, thought his eyesight poor, his head small and deformed, acted peculiarly, was irritable. Fugue, then inefficient at easy jobs. In 1903 depressed, suicidal, deluded, negativistic, but oriented; improved somewhat, but in 1904 became surly, had sudden impulsive outbreaks, was somewhat negativistic and seclusive. By April, 1908, indifferent, unoccupied, with more somatic ideas, impulsiveness and complete clearness.

A CONTRIBUTION TO THE STUDY OF PSYCHOGENESIS IN THE PSYCHOSES.*

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INTRODUCTION.

The psychoses to be considered in this paper are termed psychogenetic, because in their evolution and course there can be found a definite relation to some one or more psychic experiences which stand out prominently as of etiologic importance. They are mental disturbances developing in previously healthy individuals in consequence of some strongly affective experience either of a pleasant or disagreeable nature, and which disappear more or less promptly upon the removal of the psychic irritant which provoked them. Although this subject has been more or less overlooked in the psychiatric literature of this country, foreign writers, especially the German and French, have devoted a great amount of study to it, and the German literature is rich in valuable contributions to this subject.

That mental disorders may be due to causes purely psychic in nature is acknowledged by everyone. The older psychiatrists laid much stress on this, and to-day, although the general tendency is a materialistic one, although we are constantly endeavoring to find some organic changes in the nervous system to account for the various psychotic manifestations of the mentally deranged, we are bound to admit that there exist mental disorders purely functional in character which owe their origin to causes to be found exclusively in the psyche. Hysteria is the disorder par-excellence which illustrates the psychogenetic mechanism in the production of psychopathologic conditions. Hysteria, however, and the numerous psychotic manifestations which various authors are wont to consider as hysterical are by no means the only psychogenetic

*Thesis for promotion to Senior Assistant Physician, Government Hospital for the Insane.

mental disorders. Nevertheless, if we were to search for the reason of the failure to recognize more fully the psychogenetic non-hysterical mental disorders, we will find it predominantly in the modern conceptions of hysteria. The present teachings on the ideogenetic factor in hysteria dominate psychiatric thought to such an extent that in many quarters a psychosis is considered hysterical when in the development and course of the disorder there can be found a more or less distinct dependence upon some psychic experience. In other words, many authors consider as hysterical almost all psychically evoked mental disturbances. It is needless to say that such a view of psychogenesis is altogether too narrow a one, and it is doubtless true that because of such view many other non-hysterical psychogenetic mental disorders have been considered as hysteria.

But even if we were to agree for the moment that all psychically evoked mental disorders are hysterical in nature, it would not aid us in the least in our efforts to delimit what shall be considered as psychogenetic, for the simple reason that we are still very much in the dark as to what shall be designated as hysterical. A brief review of the modern conceptions of hysteria will convince us that although we may attach ourselves to this or that theory of the genesis of this disorder, we will still have the problem to contend with as to what disease entity or symptom-complex should be designated as hysteria. Whether we adhere to Janet's (1) disassociation or disintegration theory, or to Moebius' (2) theory of the transformation of ideas and concepts into somatic manifestations, or the Freudian (3) theory of repressed, painful affects, or lastly if we believe with Willmanns * that hysteria should be abolished altogether as a disease entity and that we should speak only of an hysterical type, the question nevertheless remains, "What is hysteria?" Is the essential factor of this disorder to be found in the hysterical, somatic stigmata, as Moebius would have it, or in the hysterical temperament, the hysterical type? Neither view offers us a proper basis for a definite delimination of hysteria. We frequently see the so-called hysterical stigmata in mental diseases other than hysteria, and we may be dealing with an undoubted case of hysteria and yet the hysterical stigmata may be entirely

* Quoted by Bonhoeffer.

wanting. Bonhoeffer (4) justly asks, "What is it that causes us to consider the functional deafness of a girl which develops following the boxing of her ears by the teacher and the Ganser pseudo-dementia state, as being both of hysterical nature?" But even if we were able to definitely delimit hysteria and recognize as hysterical a certain constant symptom-complex, the etiology of which can be definitely found in the psyche, it does not follow that hysteria is the only mental disorder which can be psychogenetically evoked, nor does it follow that an individual must be of a hysterical type in order to make the psychic incitation of a mental disorder possible. Practical experience bears out these contentions. One not infrequently meets with patients whose mental disorder can be definitely attributed to some emotional shock, whether of a pleasant or disagreeable nature, and yet neither in the make-up of the individual nor in the nature of the psychoses can there be anything found which could be considered as hysterical. A death of a near relative, business reverses or the sudden acquisition of a fortune, sudden fright or the fear of an impending calamity, a disagreeable termination of a love affair; all these have been blamed, and justly so, for the development of mental disorders in individuals who have apparently never previously shown any signs of hysteria. One need not be a psychiatrist to recall the various psychotic and psychoneurotic transitory manifestations which many a student experiences during examinations. The emotional accompaniment of the examination, particularly the emotion of fright, causes many a student to completely forget things, which he knew as well as his own name, and which he is able to readily and fully recollect as soon as the examination is over. Are we to consider all these individuals as hysterical? Some of the cases herein reported clearly show that such a view would be an incorrect one, and the work of some very prominent authorities substantiates this.

Aside from the above there is another factor which contributed somewhat towards the neglect of the psychogenetic mental disorders. I refer to the tendency produced by the Kraepelinian school to consider many isolated psychotic manifestations in previously healthy individuals as mere exacerbations of an underlying grave pathologic process. Kraepelin's establishment of the great dementia-praecox group contributed considerably towards the neglect of individual psychology, and in consequence many psychoses which

are to-day recognized as unquestionable, independent psychogenetic disorders were formerly readily placed in the dementia-praecox group. Nobody doubts the enormous advance in psychiatry which the Kraepelinian school brought about, but it is likewise asserted by many prominent authorities that his teachings led to too much generalization, so that dementia praecox has gotten to be a sort of waste-basket for all sorts of ill-defined psychoses. The same is also true of the affective-psychoses. Just as not every functional excitement or depression, even though recurrent, belongs to the manic-depressive group, so also not every catatonic picture signifies that we are dealing with a case of dementia praecox.

Nature of Psychogenesis.

A great deal has been written of late concerning the nature of psychogenesis, but the entire subject is still open to discussion. Among the various views held on the subject, the one promulgated by Birnbaum and shared in by Bonhoeffer and others is the most interesting, and the one requiring, above all others, further casuistic material to prove its correctness or falsity. Birnbaum * sets forth the dictum that the possibility of a psychogenetic incitation of a mental disorder is the criterion of a degenerative soil. According to him and his followers, therefore, it is only the degenerate, whether hysterical or otherwise, who will develop a psychogenetic disorder. Such a radical view makes us suspect, to say the least, that these authors have been somewhat too dogmatic. Of course, we are fully aware that in spite of all the efforts of Magnan, Moebius, and others to define degeneracy, we are still very far from having a common understanding of the meaning of the term, and therefore it is quite likely that Birnbaum's " degenerative Anlage " may mean something considerably different from our conception of degeneracy. Then again it must be remembered that the material which served Birnbaum and Bonhoeffer for their conclusions was derived almost exclusively from the prison milieu, and one is liable to overestimate the factor of degeneracy in dealing with this class of individuals. It is true that many patients in whom we see develop psychogenetic mental disorders make us seriously think that there is something wrong with their make-up,

* Cited by Bonhoeffer, *loc. cit.*, page 3.

especially with their affective sphere, but it is likewise true that in many others such evidences are almost entirely wanting.

We must assume this view when we remember the many instances where the same severe emotional experience has simultaneously affected a large number of people. I refer to the various psychotic and psychoneurotic manifestations, which have affected whole communities following catastrophies like an earthquake. Stierlin's (5) report of the Messina disaster furnishes us an excellent example of this. Should we consider all these people as possessing a "degenerative Anlage"? Because the fear of impending death to herself and children precipitates in a woman an anxiety neurosis, it is not at all *prima facie* evidence that her nervous organization is below par in any way.

Kraepelin (6), far from agreeing with the views of the above authors, sees in psychogenesis merely a more or less accurate psychologic indicator of the personality, character or temperament of an individual. The extent and nature of the feelings provoked by a given experience indicate the degree of intimacy which such an experience has gained to the psychic personality of the individual, and in the differences of the emotional reactions to every-day occurrences lie our means of distinguishing between the various characters, temperaments, etc. The fact that one person will react to a given emotional experience with the development of a psychosis, while the same experience may have no appreciable deleterious effect on another, is therefore only an indication of the temperament, of the character of the individual at hand. This view is by far the more acceptable of the two. We would hardly expect a certain emotional experience to have the same effect upon the sturdy cool-headed and cold-blooded Finn and, say, a Parisian. Because the one will be vastly more affected by the same experience, it does not follow that his nervous system is inferior to that of the other either through degeneracy or lack of development. The above example refers merely to racial characteristics, and is by no means an indication of the vast temperamental differences which we find even among people born and bred under more or less identical circumstances. The mode of reaction of an individual to a certain experience will after all depend upon the character and nature of all the mental experiences, of all the psychic constellations which have been at work in the making of that individual. Thus, the

habitual criminal with whom murder is but one of the many ways in which he plies his trade, could hardly be expected to react in the same manner to the emotional shock which the killing of a man of necessity produces as a previously uncorrupted individual, who in a fit of passion kills another.

White (7), in his excellent treatise on the Constitution of Consciousness, says, "A person at any particular moment is the end result of the processes that have been at work since his conception, and in the same manner a given state of mind can only be conceived to be what it is because of all that has gone before. It is the end product." In order to understand why a certain experience fails to have any appreciable deleterious effect upon one individual, and at the same time to cause another to react to it with the development of a psychosis, we must gain full insight into the character, the make-up of that individual.

Kraepelin places under the psychogenetic disorders only the various forms of traumatic neuroses and certain cases of prison psychoses, but admits that here perhaps also belong the various excitements of hysterics and psychopaths. He prefers, however, to separate the latter, and place them under the respective groups of hysteria and psychopathy, as, after all, the underlying pathologic constitution is the predominant factor in these psychotic manifestations. In making this distinction, he further emphasizes his view that not all psychogenetic mental disorders depend upon the underlying degenerative basis.

Of interest here are Rish's (8) views on the subject. He endeavors to explain the mechanism of psychogenesis by drawing an analogy between it and the normal workings of the child's brain. The better fitted we are to paralyze the deleterious stimuli which act upon our psyche by means of those restraining forces which go to form the basis of self-control, the less liable are we to develop psychogenetic disorders. In the child the development of those potential restraining concepts is a very gradual one; the child's psyche, therefore, is an open book upon which extraneous psychic stimuli engraft themselves with great facility; the child's brain is, so to speak, helpless in the face of psychic traumata. The same helplessness against the influence of psychic injuries Rish believes to exist in the nervous system of those individuals who are to develop psychogenetic disorders. In other words, these individ-

uals lack the mental attributes which go to form our will power, and are, therefore, unable to withstand mental shock. It would, therefore, appear from the preceding that the will and the various other agents which determine the degree of self-control an individual possesses are the sole factors which likewise determine whether a given individual when placed under a certain stress will or will not develop a mental disorder. This is indeed a very simple solution of the problem, but it seems to me that it hardly suffices to explain the mechanism of psychogenesis. We can no more speak here of a dependence upon conscious will power than we can in the case of a fractured limb received in a railroad accident. The author, it seems to me, neglects the most essential factors which are potent in the mechanism of phychogenesis.

Psychogenesis to my mind depends essentially upon the following three factors: (a) The nature of the experience, the affective value which the experience possesses; (b) the degree of acuity with which it has been perceived and the intimacy which it gains to the psyche; (c) the definite character of the "psychic whole," of all the mental processes which have been at work in making an individual precisely what he is. To say that the development of a psychogenetic disorder presupposes the existence of a degenerative soil, or that the process depends upon a lack of development of those restraining forces which go to make up our will-power, would rob psychogenesis of its right to be considered as a more or less normal psychologic process. Does the individual exist about whom we can say, "Here is a man whose nervous system is so stable that it can withstand all manner of nervous or mental shock?" If the affective value of an experience be strong enough, there is no one who would be able to withstand its effects upon the psyche. The extent of its effect will depend upon the degree with which the experience is felt by us. We do not all feel alike about a certain experience and, therefore, we are not affected alike by it. In the same way, the reaction to a certain experience would differ in different individuals, and will depend upon the hereditary and environmental differences of the two. One who has lived a smooth life, without suffering or struggle, with ease and comfort on every hand, can hardly be expected to look upon the world, to react to his wide range of experiences in the same manner as one who has been born in poverty, whose entire life is one long struggle for mere existence,

with miserable and wretched surroundings, etc. If the authors above referred to mean by "degenerative Anlage" a hereditary defect, they apparently wholly neglect the important part which environment plays in the making of an individual just what he is. No, psychogenesis is not merely an expression of the defective, but a psychological index of the individuality, the personality.

Symptomatology of the Psychogenetic Psychoses.

This brings us to the consideration of the symptomatology of these disorders, and a review of the literature on the subject makes it at once apparent that the manifestations of the psychogenetic mental disturbances are very protean in nature. In fact, one can hardly speak of a distinct symptom-complex which may be designated as typical of these disorders. They simulate any of the known psychoses in their symptomatology, and were it not for the definite mode of genesis of these disorders (which here is the all important factor), they could hardly be differentiated from the other psychoses. Thus the psychogenetic mental disturbances are not characterized by any definite clincial picture, but by the mode of their evocation and course. Our study of these psychoses should, therefore, not consist merely of a clincial observation and recording of the finished product, but of a thorough investigation of the psychologic factors and motives which have been operative in the production of same.

Bonhoeffer * speaks of maniacal excitements and genuine depressions which may follow experiences of an emotional nature. He concurs with Reis' view concerning the psychogenetic states which he designates as "reactive depressions." These are pathologic depressive states which do not belong to the manic-depressive group, and which develop upon a constitutional basis. They concern individuals who from childhood show an inclination to take things seriously, whose depressive affective reaction has a tendency to be very strong. These individuals develop in connection with any strong psychic shock decided psychotic depressive exacerbation which may be considered psychogenetic also from the fact that coincident with the removal of the psychic factors concerned in the production of the depression, these exacerbations of the

* *Loc. cit.*, page 3.

basic diathesis disappear. The disease picture itself may not differ in any way from the depressive phase of manic-depressive insanity, but a very characteristic feature of these psychoses is the fact that the occurrence which brought about the depression plays a more or less important role among the depressive ideas. Reis emphasizes the fact that the extent of the depressive ideas never reaches beyond the pale of the psychologically related subjects of the psychogenetic depressive complex. Retardation is usually absent. On the contrary there occur in certain cases periodically exaggerated expressive movements of despair, crying, and a sort of hysteriform behavior. Even genuine hysterical symptoms may become manifest. The development of reactive manic states in those of a constitutionally hypomanic disposition is, in contradistinction to the opposite phase, a much rarer occurrence. Bonhoeffer believes, however, that this may refer to those individuals who, without ever developing genuine maniacal attacks, become as a result of some fortunate experience excessively communicative, liberal and active, far beyond their usual disposition, and which they themselves later recognize as having been pathologically overdone.

Risch,* after reviewing in an excellent manner the various psychogenetic manifestations which one may observe among school children, speaks of a certain condition in young girls, which, because of their symptomatology, he was want to consider as katatonia, but the later course of which convinced him beyond a doubt that he was dealing with purely psychogenetic disorders. These patients were frequently taken home by relatives against the advice of the physician, and promptly recovered their normal health upon reaching home. Hysterical features were wanting in those conditions, and in all of them he could find some sort of mental anxiety or shock concerning a love affair as of etiologic importance. The anamnesis frequently revealed that the withdrawal of a betrothal, or any other unpleasant termination of a love affair; sexual traumata, etc., stood in immediate relation to the psychosis. Upon experiences of this sort he bases the belief that in many phychoses of young girls, which are being so readily diagnosed as dementia praecox, a much more correct prognosis could be rendered if their true nature were recognized through a more careful attention to the psychogenetic factor.

* *Loc. cit.*, page 7.

We have seen so far that there exist psychogenetic depressions, excitements and katatonic states, which do not belong to either the manic-depressive or praecox groups, and which differ from the endogenetic well-known disease states in that they owe their existence to some extraneous psychic factor, preferably of a strongly affective value.

We will endeavor to substantiate in a measure the foregoing contentions by means of the following cases:

CASE I.—M. L. K., æt. 17 years, a white girl, was admitted to the G. H. I. from St. Rose's Industrial School on September 30, 1910. Pat. G. F. died from the effects of chronic alcoholism; Pat. G. M. died of dropsy; Mat. G. F., of tuberculosis; Mat. G. M., of cancer of throat; mother died of cancer; father, from effects of chronic alcoholism; was insane for two or three weeks prior to his death at the age of 45. A Pat. uncle committed suicide; was supposed to have been insane at the time.

Patient is an only child; born in Washington, 1894; birth and childhood normal; attended graded school until the death of her parents, when she was placed in St. Vincent's Orphanage by an aunt. Here she further pursued her studies, but her school career was below par. At the age of 14 she had reached only the 3rd grade. She was then placed in St. Rose's Industrial School, where she remained until transferred to this institution. She did not show any signs of mental disorder until early last summer, when she heard that the young man with whom she was in love had married another girl. It appears that the two were chums from childhood, and that their parents had made a sort of partial arrangement that the two should marry each other. Last summer, while on her vacation, she again met this young man, and he was very attentive to her. Her old love for him was revived, and she began to entertain the hope that he would eventually marry her. The news of his marriage to another girl was a tremendous blow to her. She became depressed and morose; began to entertain the idea that she was too stout, and commenced to fast, and practice onanism. She became very religious, introspective, and developed self-accusatory ideas; was constantly visiting priests, making repeated confessions; developed various somatic disturbances, until finally the idea of having committed the unpardonable sin became so prominent and dominated her conduct to such an extent that her transfer to an institution became imperative. On admission to the G. H. I. she was deeply depressed, agitated, and very apprehensive. She feared some impending evil as punishment for her past sins. She was clearly oriented; showed no intellectual defect, and possessed a certain amount of insight into her condition, inasmuch as she realized that she was different than formerly. Hallucinations were not manifested. She possessed the fixed idea that she was guilty of some unpardonable sin for which she would never be forgiven; was highly religious, and constantly wanted to see a priest. After a

sojourn of about two months she improved sufficiently to be discharged in the care of the authorities of the Industrial School. Her conduct at that time, so far as could be determined, was normal. She no more entertained the idea of having committed an unpardonable sin, became reconciled to her lot, and, simultaneously with this, her depression and agitation disappeared.

We are dealing here with a patient who, to start with, is very badly tainted hereditarily, a fact which possibly had something to do with the making the development of a psychogenetic disorder possible. That the psychosis from which she suffered belongs to this class of mental disorders there can be no doubt. Cause and effect, and the dependence of the disorder upon a definite situation, are so clearly evident here that no further proof of the psychogenesis of the same is needed. Of interest is the psychological mechanism in the shaping of the psychosis. We are not dealing here with a symptomatology which appears to us as something strange, inexplicable, as is the case so frequently in dementia praecox. We can here almost definitely account for every one of her symptoms. She is in love with a young man whom she hoped to marry some day. Suddenly she receives the news of his marriage to someone else. She becomes morose and depressed, and in her troubled state of mind begins to seek an explanation for his act. Because of her love for him, she wishes to justify in a measure his act, and succeeds, so to speak, in doing so, by taking all the blame upon herself. She develops derogatory ideas concerning herself. She is too stout; is guilty of the unpardonable sin, etc., and in consequence turns to fasting and religiosity. Her depression, anxiety for the future, zealous endeavors at penitence, finally reach a degree where further sojourn in her environment becomes impossible, and she is transferred to a hospital for the insane. Here, under new surroundings, she begins to see things in their true color, becomes reconciled to the situation, and gets well simultaneously with the disappearance of the factor which was operative in the production of her psychosis.

Case II.—G. F., æt. 23 years, white, female, whose father was alcoholic; family history otherwise negative. Her birth and childhood were normal until the age of 7, when, as the result of catarrhal inflammation of the nose and ears, she became deaf. She obtained her education in various schools for deaf-mutes, and reached quite a degree of efficiency; studied Latin, biology, trigonometry, and geology. While at Kendal Green College

she became enamoured of an employe there, who happened to be a married man. He reciprocated, however, and promised to divorce his wife in order to enable him to marry the patient. The authorities of the school, upon discovering her relations with this man, prevented her from further seeing him, whereupon she became morose, depressed, refused nourishment, and finally attempted suicide by drowning. She was admitted to the G. H. I. in a very depressed state; refused nourishment, which she had not taken then for four days, and had to be tube-fed. She wept a great deal day and night, and was absolutely inconsolable. She was clearly oriented and had a full appreciation of the entire situation. No delusions or hallucinations were manifested; no intellectual defect beyond that caused by her deaf-mutism could be manifested. Several days after admission she was visited by an official of the school, who told her that she would have to give up the idea of marrying this man, as he was already married, and under no circumstances could they tolerate her relations with him. At this she wept a great deal, and after a few days' sojourn she became reconciled to her lot, began to improve, and was discharged as recovered seven days after admission.

Here again we can clearly see the dependence of the mental disorder upon a definite idea, and one of a strongly affective value. As a further proof of the psychogenetic character of this disorder is its total dependence upon environmental conditions. Here, too, upon being removed from the scene of her trouble, a compromise is reached with the situation, and she gets well after a sojourn of a few days at the hospital.

Case III.—T. A. P., æt. 22 years, a male Jamaican, whose family history is negative, except that one brother suffers from epilepsy; his childhood and youth normal; he made good progress at school, and finally came to Washington and entered the medical department of Howard University. Everything went well until, for some reason, his father cut off his allowance, which necessitated his abandonment of the medical career. He became very despondent and depressed in consequence of this, and began to tire of life. His hope, however, rested in a young woman with whom he was in love, and who helped him a great deal to bear his troubles. The climax was reached when this woman deserted him also, and not being able to stand the situation any longer, he made several desperate, unsuccessful attempts at suicide, which brought him to the G. H. I. On admission he was markedly depressed, and heard voices telling him to kill himself. Aside from this he showed no psychotic disturbances. Soon after admission the hallucinations disappeared, he became cheerful, took a normal interest in his environment, and after a sojourn of three weeks he was discharged as recovered, with insight.

There was no question here of an endogenetic disorder. The patient himself realized and fully understood the mechanism of

his psychosis. He wanted to commit suicide for certain definite reasons, but in order to make an act of which he otherwise did not approve, acceptable to himself, voices commenced to tell him to kill himself. The salutary effect of the removal to a new environment is also evident here.

CASE IV.—W. M., æt. 35 years, was admitted to the G. H. I. on March 22, 1911, in a state of agitated depression. She was very apprehensive of some impending evil, restless, and evinced considerable worry and anxiety about her children, whom she left at home. She expressed various persecutory delusions with reference to her husband; stated that he attempted to poison her last winter by placing paris green and other poisonous stuff in her food; that he had chloroformed her; she could smell the chloroform, etc. She was thoroughly convinced of the correctness of these ideas, and accused her husband of being liable to do anything. She was clear mentally; well oriented in all spheres; and, aside from her agitated depression, her outward conduct showed no disorder. She readily adapted herself to her new surroundings, and after a sojourn of a few weeks was placed at work in one of the dining rooms, where she preformed her duties in an orderly and diligent manner. Special intelligence tests revealed no intellectual impairment. She gradually recovered from her depression; her paranoid ideas disappeared, and she was discharged as recovered with insight on July 12, 1911. Her family history revealed the following: She came from a very ordinary stock in Ireland. Her father, who was an alcoholic, deserted his three children soon after his wife's death. It is not known whether he is living at the present time. Her mother died at the age of 35 of some stomach trouble. The patient was the youngest of a family of three, and received very little education. She had the ordinary diseases of childhood, from which she made good recoveries. She lost her mother when eight years of age, and from that time until she was a young woman was cared for in a sort of irregular manner by friends. A part of her girlhood she spent in a convent in Ireland. Since the age of 10 she has been obliged to shift for herself, acting as child's nurse, and working about the house as a general utility girl. She immigrated to this country at the age of 18, worked several years here in the capacity of domestic and chambermaid, until 1897, when she met her future husband. There was no marriage ceremony performed, and three months after they met, they went to live together. She gave birth to three children, but her conjugal life has been one of privation and unhappiness. Two of her children are alive, one eight and the other four years of age. Following the birth of her second child in 1908, she was treated in a hospital, apparently for puerperal infection. Her husband has been addicted to the use of alcoholics all his lifetime and has never been a good provider for her or her children. In consequence of this, they have moved from place to place, ever since they have been living together. About three years ago they came to Wash-

ington, where she was in hopes that their financial affairs would improve, but her husband continued his dissipations, and from time to time she and her children have been in need of food and clothing. In the summer of 1909 she went to Providence Hospital (Catholic institution) to undergo an operation. While there she came under the influence of her early religious training. She told the visiting priest that she was living in a state of sin with her supposed husband, that she was not married to him, and asked his advice what to do. After considerable urging, she finally induced the man to marry her. Several months after the ceremony was performed her husband told her that he had already a wife living in France, and that he was guilty of bigamy. He told her that upon his arrival in this country he assumed a different name; that he frequently saw his former wife in his dreams, and at times longed to be with her. This came as a severe shock to the patient, and caused her great mental suffering. She began to think a great deal about this, but eventually decided to continue to live with him for the sake of her children. Her conjugal life, however, has been a very unhappy one since then. He had deceived her, and she has distrusted him more or less since his confession to her. For four months before admission, she worried about her past life, and during this period of time suffered an unusual amount of privation. Her husband became more negligent of his duties to the family; would lie all day in bed in an intoxicated condition; and she developed the idea that, in addition to alcohol, he was using opium and other drugs. Her husband became irritable and morose, and she commenced to entertain the idea that he would like to be rid of her. She became apprehensive and watchful of his movements. One day he attached a tube to the gas pipe leading to the house, which he connected to the fixtures in the house. This frightened her very much. She interpreted his act as a preparation for getting rid of her. She thought this might be a means to rid himself of undesirable relations with her. Last February her husband told her that he had taken paris green. He was very sick for several days and she thought that his statements were true. The idea then took hold of her that he might possibly try to take her life and that of her children. She was afraid to stay with him in the same room, and would sleep in a separate room with her children. On March 17 she passed into a state of excitement, and thought he had attempted to kill her. She ran out into the street with her youngest child in her arms, and appealed to the police; refused to return to her husband, and in consequence was sent to the Washington Asylum for treatment, from which place she was transferred to the G. H. I. The medical certificate which accompained her from that institution stated that she was temperate in habits; that she was very excited and agitated. She stated her husband was living in Washington under an assumed name; that he has tried repeatedly to poison her by sticking hypodermic needles all over her body; that he also throws chloroform at her, and rubs morphine on her face. She frequently becomes excited, and delivers religious sermons. She states

a red-haired woman comes to her bedside every night and remains until morning.

Upon a closer analysis of this case we find that, to start with, we are dealing here with a rather primitive and ignorant sort of individual, whose early life had been imbued with a marked religious content (life in a convent). She meets a man, sacrifices all her religious training and belief for the love she bears him, and becomes the mother of his children without being legally married to him. In spite of many disappointments in their conjugal life, all goes well until she is placed by chance under the influence of her early religious training. The enormity of her iniquity begins to dawn upon her, she becomes remorseful, and in the effort to square herself with the situation, she endeavors to persuade him to marry her. This, for certain reasons, he refuses to do, and she experiences her first real disappointment in life. The man whom she trusted so implicitly all these years, for whom she sacrificed so much, refused to do the one thing which would appease her remorseful conscience—which would save her and her children from disgrace. She begins to brood over this; their relations become strained, and the first seeds for the development of the future paranoid trend with reference to him are sown. After numerous endeavors, she finally succeeds in forcing him to marry her. She becomes appeased; she is, so to speak, square with the situation; and then, like a thunder-bolt out of a clear sky, his awful confession is thrust upon her. The emotional shock which the news of the deceit and corruption of the man she loved and trusted, and for whom she sacrificed all, had upon her, can easily be guessed at. What is she to think of him now? At last she has found the key to the entire situation; now she knows the reason of his persistent refusals to marry her. She becomes suspicious of him; begins to watch his movements; becomes depressed, and filled with a sort of vague apprehension as to what might happen next. The climax is reached when he tells her that he had taken paris green with suicidal intent. Why should he want to commit suicide? Is it because he finds this the only way out of the hopeless situation in which he had placed himself by his confession! Then the idea occurs to her, perhaps he would avail himself of the only other alternative; perhaps he would desire to do away with the living obstacles in his path—his wife and children—rather than to kill

himself. This gradually becomes the all-dominating thought in her troubled mind. It assumes a degree of hyperquantivalency, she becomes more and more suspicious of him, and finally reaches a point where she is afraid to trust herself alone in a room with him. Her mental agitation and apprehension reach a pathological degree. She interprets the most trivial acts of his in a delusional way. He smokes his pipe in bed in order to suffocate her; he attaches the tube to the gas pipe in order to asphyxiate her, etc.; and, finally, she actually detects the poisonous odors; her food tastes peculiarly, and her delusional ideas become supported by fallacious sense-perceptions. Up to now the psychosis affects predominantly her ideational sphere, and is supported by elementary hallucinations; but finally she can no longer bear to reason with herself, to hide her emotions; and she gives vent to them in an outburst of excitement. She wildly rushes out from the house in the dark of night to seek protection of the police. In this state we receive her in the hospital. Here, in addition to her paranoid ideas with reference to her husband, she becomes agitated and depressed; she fears for the safety of her children whom she left in the care of her murderous husband. The new life at the hospital, with which she becomes suddenly surrounded, has a most salutary effect upon her disturbed emotions. She becomes more or less tranquil after a sojourn of a few days. Coincidentally with this, she begins to see things in a clearer light. After all, her husband is not what she believed him to be. Didn't he make proper provision for her children in her absence? Didn't he show a great deal of concern regarding her condition by coming to see her and endeavoring to assure her of his fidelity? Her troubled mind is pacified, and she gets well in a short time.

I have endeavored to show, by the analysis of this case, how distinctly cause and effect can be followed out, both in development and cessation of this woman's mental disorder. There can be no question here of an endogenetic psychosis, either of the deteriorating dementia praecox group, or the recoverable manic-depressive psychoses. Here we are not dealing with strange, unpsychological disease manifestations, for which, try as we may, no adequate explanation can be found. On the contrary, we can positively account for every one of her symptoms. We can almost say that her mental disorder had to manifest itself just as it did, and

in no other way. We are clearly dealing here with an ideogenetic disorder, the psychic causes of which need not be searched for by special psychoanalytic methods in the sub-conscious, but which stand out before us in a clear and tangible form; we are confronted here with a psychogenetic psychosis, which completely disappears upon the removal of the psychic factors instrumental in its causation

The Acute Prison-Psychotic Complex.

Recognizing then, as we must, that various situations of everyday life may have such a deleterious effect upon the psyche of an individual as to provoke a mental disorder, it becomes at once apparent that the more serious conflicts of life will contribute in a still greater measure to the development of mental disorder. Among these, conflicts with the law take the first place, and it is among prisoners that we must above all seek for psychogenetic disorders.

Kraepelin * asserts that mental disorders occur ten times as frequently in prison as in freedom. The criminal, who in most instances is already burdened with a more or less strong predisposition to mental disorders, upon being placed in prison, finds himself at once in a most favorable environment for a mental breakdown. It is true, imprisonment acts more deleteriously upon the psyche of the criminal by passion, the accidental criminal, but even the recidivist who would be expected to feel less keenly the painful loss of freedom, falls a prey to deleterious effects of prison life. The unfavorable hygienic surroundings which are found in most prisons, the scarcity of air and exercise, readily prepare the way for a breakdown even in an habitual criminal. Above all, however, it is the emotional shock and depression which invariably accompany the painful loss of freedom, the loneliness and seclusion which force the prisoner to a raking occupation with his own mind, to a persistent introspection, making him feel so much more keenly the anxiety and apprehension for the future, the remorse for his deed, that play an important rôle in the production of mental disorders. This is especially true when it concerns an accidental criminal, one who still possesses a certain degree of self-respect

* *Loc. cit.*, page 5.

and honor. Imprisonment furnishes us with a great variety of mental disorders, the origin of which can be traced in a more or less direct manner to the emotional shock and influence upon the psyche which it brings about.

The psychogenetic origin of the psychoses of criminals can be established far more clearly in prisoners awaiting trial. Here the deleterious effect of confinement upon the physical health can be ruled out almost entirely, and the etiologic factor must be sought for exclusively in the emotional shock which the commission of the crime and its attending consequences provoke. The strong effect upon the psyche produced by the detection and confinement, the raking hearings and cross-examinations, and the uncertainty and apprehension of the outcome of it all are the factors that are at play here.

Reich (9), in 1871, was the first one to call attention to the mental disorders of prisoners awaiting trial. He could observe the development of mental symptoms even during the first hours of confinement, and the relation between the psychosis and the emotional shock of the situation at hand could not be doubted. He describes this acute mental disturbance as follows: "Already in the first hours or days after imprisonment, or soon after a severe emotional shock, a sort of psychic tension sets in. The prisoner becomes silent, chary of words, lost in brooding. He observes little that goes on about him, and remains motionless in one spot. His face takes on an astonished expression, the gaze is vacant and indefinite. If he makes any movements at all they are hesitating, uncertain, as those of a drunken man. Vertigo and aura-like sensations appear; severe anxiety overpowers the patient, which with the entire force of a powerful affect crowds out all other concepts and sensations and dominates the entire personality. Consciousness becomes more and more clouded, soon illusions, hallucinations and delusions appear, and the prisoner becomes especially taken up with ideas of unknown evil powers, of demons and spirits, and of being persecuted and possessed by the devil. Simultaneously they complain about all sorts of bodily sensations. In isolated cases one may observe convulsive twitchings of the voluntary and involuntary musculature. Finally severe motor excitements set in. The patient becomes noisy, screams, runs aimlessly about, destroys and ruins everything that comes his way. With this the disease has reached

its height. At this stage consciousness is entirely in abeyance and the disorder is followed by complete amnesia." Reich supposes that this acute prison psychosis may be included in that large group of abnormal psychic processes, developing from affect and affect-like situations.

Reich's important work remained the only one on the subject until 1888, when Moeli again called attention to it. Moeli (10) spoke of patients in whom an apparent total blocking of all thought processes took place. They would exhibit complete ignorance of the most commonplace facts, would forget such well-known things as their own name, place of birth or age, were unable to recognize the denominations of coins, etc. He noted, however, that although the answers these patients gave were false, they had a certain relation to the question. For instance, coins of a lower denomination would be mistaken for higher ones, postage stamps were called paper, etc. They also showed a marked tendency to elaborate all sorts of false reminiscences about their past life. Along with this failure of the simplest thought and memory activity, these individuals were otherwise well-ordered and behaved.

The reader will at once recognize in the above description the well known Ganser symptom-complex, the several variations of which have been so frequently discussed of late years. Ganser (11) further showed that these cases frequently evidenced vivid auditory and visual hallucinations. At the same time there existed, more or less, a distinct clouding of consciousness, with the simultaneous presence of hysterical stigmata, especially total analgesia. After a short time recovery took place, the patients suddenly awoke as if from a dream and evidenced a more or less complete amnesia of the events which had transpired.

Numerous discussions concerning this disease picture have appeared of late years in literature. The Ganser symdrome, or twilight state, has been enlarged upon, and several variations of this condition have been isolated. The chief contention, however, of the various authors on this subject, seems to be whether this symptom-complex should be considered as hysterical or whether it should be placed among the large group of degenerative states. Both views are ably defended by prominent psychiatrists. I have recently observed the Ganser syndrome in an undoubted case of toxic exhaustion psychosis.

Raecke (12) designated this disease picture described by Moeli and Ganser as an hysterical twilight state in psychopathic individuals. These conditions were developed in them as the result of emotional excitement in imprisonment. The constant hearings, the confusing cross-questioning, the fear of punishment, finally the injurious effect of solitary confinement, shock and weaken the slight mental tension of the prisoner to a marked extent. As a result of this, we have on the one hand a condition of apathy, of inability to concentrate the mind, of incapacity to think and of a sort of feeling of being wholly at sea, accompanied by vertigo and other nervous manifestations, while on the other hand the physical despair, the obstinacy of the prisoner, now increase to pathological manic attacks, now again are changed to stubbornness, mutism, with refusal of food. At the same time the more or less constant wish to be considered sick, and in consequence, to be freed from imprisonment (and in this we see perhaps the hysterical component) may influence deleteriously and in a peculiarly modifying way the disease picture. The various questions put to the patient by the examiner may act as so many suggestions. Raecke further calls attention to the manifold similarities which these conditions may show with catatonic processes. In these hysterical twilight states, quite aside from mutism, negativism and catalepsy, peculiar mannerisms were noted, a sort of affected, childish way of speaking, motor stereotypies, swaying of the head, running in a circle, queer actions and sudden expression of senseless word combinations. In a later work Raecke (13) decribes a symptom-complex, which he designated as " hysterical stupor in prisoners," and in which the catatonic symptoms exist in a still more pronounced manner. The severe forms of this disorder, which may extend over weeks and months, are liable to be confused with progressive deteriorating processes, especially so because those symptoms which were wont to be considered by many as positively unfavorable prognostically, may be found here in very deceptive imitations. Thus the affected, silly behavior, impulsive actions, temporary verbigeration, senseless word salad, grimacing, stereotypy, attitudinizing, etc., which these patients exhibit, may easily be mistaken for the typical catatonic picture of dementia praecox. According to Raecke's view the hysterical stupor is closely related to the Ganser twilight syndrome. Stuporous conditions may introduce the latter and, vice

versa, Ganser complexes may creep into the stupor. Raecke's stupor, like Ganser's twilight syndrome, frequently develops in criminals immediately after arrest or as a result of great physical or psychic exertion. Sometimes the stupor is preceded by convulsions, at other times by a prodromal stage of general nervousness. In still other cases unpleasant delusions and elementary hallucinations precede the stupor, which may follow immediately after this prodromal state or may be again preceded by a short attack of mania with clouded consciousness. In contrast to the genuine catatonia, Raecke's stupor as well as Ganser's twilight state are characterized by *a high grade of impressionability to things in the environment, which may at any time suddenly cause a complete transition from an apparently deep stupor to normal manner and behavior.* Headaches, vertigo and various hysterical stigmata are common to both the hysterical stupor and the Ganser twilight state. At times recovery takes place suddenly, but as a rule it is gradual and remittent in character. The duration of the disorder differs. It may last for hours or months, and there generally remains a more or less pronounced amnesia for the entire period of stupor.

Kutner (14), in a work on the catatonic states in degenerates, describes this condition at length. Although recognizing a good many hysterical features in these patients, he prefers to place these catatonic conditions under the general group of the psychoses of degeneracy. He does not add anything worthy of note to what Raecke had to say concerning this mental disorder, but the differentiating points which he advances between it and the genuine catatonia are of interest and should be mentioned here. Among these he mentions, first, the development of the disorder upon a grave degenerative basis; second, the sudden development of the psychosis as the immediate result of a situation strongly affective in nature, such as a threatening or beginning prolonged imprisonment; third, the more or less sudden disappearance of the entire symptom-complex upon a change of environment; and lastly, the lack of secondary dementia. This absence of a dementia cannot be explained by mere assertions that these cases have perhaps not been followed out long enough. Bonhoeffer studied some of these cases for ten years, and in none of them could he observe any sign of a deteriorating process.

It may perhaps be of interest to finally mention here Reich's fantastic form of degenerative psychosis, which is nothing more nor less than another attempt at describing the original Ganser twilight state in a modified form.

It will be seen from the preceding that the disease pictures described by Reich, Moeli, Raecke, Kutner, Ganser, Rish, and others, are so closely related that any attempt at separation must of necessity be more or less of an artificiality. The question whether this condition, because of certain isolated hysterical components, deserves to be considered as hysterical in nature, is by no means solved. The mere presence of physical, so-called hysterical, stigmata is not sufficient, as has been stated elsewhere, to call a disorder hysterical. Bonhoeffer, who, in opposition to such authors as Willmanns, Birnbaum, Siefert, and others, insists that this so-called prison-phychotic-complex in its narrower sense is of hysterical nature, does so because he claims to be able to see in these patients the dominance of a wish factor, namely, the wish to be considered insane, and consequently to be transferred to an institution for the insane. He explains the recovery of these patients upon being transferred to an institution on the basis of a fulfillment of this wish. The majority of these authors, however, agree that a certain degenerative basis is essential to permit of the development of these conditions. My experience has been that it is very difficult in most instances to differentiate these acute psychogenetic states from certain hysterical conditions. Some of them show a good many hysterical symptoms, while in others such are absolutely wanting. One of the cases herein reported illustrates this point especially well. This patient was admitted to our hospital on two occasions, the first time while awaiting trial on a charge of murder, and the second time soon after conviction and sentence to life imprisonment. His first attack showed very little, if anything, of a hysterical nature, while his second attack had so many features of hysteria that it could hardly be considered anything but a psychosis of an hysterical nature.

Case V.—E. E. Negro, æt. 32 years. One sister insane, a brother is said to be subject to convulsions. Patient's birth and childhood normal; attended school for three or four years, where he made normal progress. He entered upon the life of a common laborer when quite young, and always managed to earn a substantial livelihood for himself and

family. With the exception of typhiod fever at six or seven he was never ill before. He used alcoholics in moderation, and denies venereal history. Criminal history is uncertain; according to his statements he was arrested but once before, for fighting. It appears that he was working as usual up until August 19, when he was arrested on a charge of assault and robbery. The patient has but a hazy recollection of this; he cannot say how long ago it was, but thinks it was sometime in August; he was arrested at night; cannot state just what time, but is certain it was after sunset; does not know who arrested him; says there were several of them; does not know whether they were policemen or detectives. The police records show that he was arrested on the night of August 19 after a desperate fight. The following day he suddenly went insane in his cell at the 4th precinct station house. He became very excited; commenced to shout that he had been shot in the abdomen by an enemy. When offered food he threw it at the policeman through the bars of his cell door, and then began beating his head against the walls of his cell. He was transferred to the observation ward of the Washington Asylum Hospital. The records of that institution show the following: On admission he was yelling, cursing, and very much excited; completely disoriented; repeated the same sentence over and over again in a singing fashion. He talked to the Lord, and answered imaginary questions; had auditory and visual hallucinations, and various delusional ideas; thought someone was talking to him constantly; that he was being shot at every few minutes; and yelled with anguish at each supposed shot. He cried and sang alternately. Owing to his marked excitement he had to be kept in constant restraint.

On admission to the G. H. I. on August 23, three days after the onset of the disorder, he was in a semi-stupor; no replies could be gotten to questions, and his attention to the extent of looking at the examiner could be obtained only after vigorous shaking. General hypalgesia was present; he responded but very feebly to pin pricks. He was absolutely passive to the admission routine, and showed no resistance whatever to what was being done to him. His body did not show any resistance to passive movement, on the contrary it was rather limp. He was lying in bed, staring in a fixed manner straight ahead of him, and would emit an occasional grunt, and a few unintelligible words. He refused nourishment, was untidy in habits, and appeared to be wholly oblivious of his environment. Respiratory and cardiac action somewhat accelerated; pulse rapid and feeble.

August 25.—Continues in the same stuporous state; absolutely oblivious to his surroundings; refuses food; untidy in habits. Aside from an unintelligible word or two, has not spoken any since admission. There are several beginning pustules on his back.

August 28.—Some improvement noted; asks for water spontaneously; when spoken to, says his back hurts him, and that they are pouring water on him. "I read the book, I went to church." Unable to feed himself, or dress without assistance; totally disoriented.

August 30.—Came out on the hall to-day, and spent the time sitting quietly on a settee; does not take any interest in his surroundings; has not spoken any spontaneously. Answers are given in a brief, and retarded manner, preferably in monosyllables, and not to the point. On being questioned concerning orientation, says, "My back, church, the book; they are burning me up." Appearance indicates marked confusion.

September 3.—The patient suddenly became clear mentally this morning; seems to have completely recovered from his stupor; attends to his wants, and answers questions in a clear and coherent manner. Approached the physician this morning and asked for a laxative; says he remembers nothing that transpired during the period since his arrest and a day or two ago, when he began to see things more clearly; complains of pain in back; does not know where he is, and thinks he came here yesterday.

Q. "Your name?"

A. "E. E."

Q. "Age?"

A. "I will be 33 the 16th of this coming April."

Q. "When were you born?"

A. "In 1879."

Q. "What is your occupation?"

A. "I am supposed to be a huckster."

Q. "Where were you born?"

A. "At Columbus, South Carolina."

Q. "What day is this?"

A. "Sunday (C.)"

Q. "Date, month, and year?"

A. "It's the 9th month, 1911; I don't know the date; I have not seen the almanac."

Q. "What time is it?"

A. "I don't know, sir; I think it is pretty near 1 o'clock. (C.)"

Q. "Where did you come from?"

A. "I don't know where I came from; they hit me over the head."

Q. "When did you come here?"

A. "I don't know; I look out of that building that looks like the House of Rep."

(After studying a while the surrounding country, says, "Lets see, this must be Anacostia, ain't it; I never was out here before.") (C.)

Q. "How long did it take you to get here?"

A. "I don't know, sir."

Q. "Name this place."

A. "You've got me now."

Q. "Where is it located?"

A. "It seems to be in Anacostia, the way I can figure it out." (C.)

Q. "What sort of a place is it?"

A. "Well, to my judgment, it looks as though it's all right."

Q. "Who are these people about you?"

A. "I don't know sir."

Q. "Is there anything wrong with them?"
A. "Well, I don't know, I am afraid to say; I don't know the nature of anybody but myself."
Q. "Why do you suppose you are being asked these questions?"
A. "Well, I think it is to sound my knowledge."
Q. "Why were you sent here?"
A. "I don't know sir."
Q. "How do you feel?"
A. "I feel all right, with the exception of my back."
Q. "Are you sad or happy?"
A. "Well, I am neither one."
Q. "Are you worried about anything?"
A. "No sir."
Q. "Did anything strange happen to you for which you can't give yourself an account?"
A. "I can't understand what happened to me, or why I am here."
Q. "Do you hear voices talking to you?"
A. "No sir."
Q. "Do you see any strange things?"
A. "No sir, I don't see anything strange, only my surroundings."
Q. "Do you ever have fits or convulsions?"
A. "No sir."
Q. "Did you ever try to commit suicide?"
A. "No sir, and ain't never going to try it."
Q. "Is anybody trying to harm you in any way?"
A. "Yes, I really believed somebody tried to do something to me."

The foregoing questions were answered without hesitation and in a prompt manner.

September 6.—To-day patient gave in a coherent and relevant manner his past history. He talked freely, and all evidences of suspiciousness or evasiveness were absent. Upon examination he was found to be perfectly oriented in all spheres; free from delusions or hallucinations, and possessed quite a degree of insight into his recent mental disorder. While reluctant to admit that he had been insane, he fully realized that something was wrong with him. He showed a normal emotional reaction to the situation at hand, felt satisfied with his surroundings and was very much concerned and anxious about his release. Special intelligence tests failed to reveal any intellectual defect. He was found, however, to be a rather ignorant darky. Memory and attention unimpaired. Apperception good; physical examination showed him to be a well developed man of medium size, height five feet three inches, weight 150 pounds. Aside from several pustules on the back, he showed no physical disorders. Neurological examination, negative.

September 14.—Patient was to-day discharged by a jury as not insane. He presented a normal appearance upon leaving the hospital. Insight was good, and there existed a total amnesia for the period between August 19, when he was arrested, and Sept. 3, when he recovered from his stupor.

This case illustrates in an excellent manner the development of a mental disorder as immediate consequence of a situation strongly affective in nature, in the instance threatened imprisonment for a grave offence.

The emotional shock of the arrest called forth in this, to all appearances, previously normal individual a marked excitement, accompanied by hallucinations and fleeting delusional formations. This excitement, which required the application of constant restraint, was followed by a stuporous state and total clouding of consciousness. Upon being removed to a hospital, and surrounded by a new environment, patient gave evidence, after a sojourn of only a few days, of the salutary effect of such procedure. On September 3, ten days after admission, the stupor disappears, and the only residue of the one-time psychosis is a complete amnesia for the entire period. The amnesia and the hypalgesia, which the patient manifested on admission, are the two symptoms which may perhaps be considered as more or less hysterical in nature. Aside from this, it is difficult to see wherein the psychosis resembles an hysterical disorder. Another point, which should be mentioned here is passing and which will be dilated upon later, is the medico-legal importance of this class of cases. This patient was wanted for assault and robbery in an adjoining state. Upon his admission to this institution an inquiry was received from the U. S. Attorney for the District of Columbia as to the probable duration and course of this man's disorder, as they had in possession extradition papers from the authorities of the state in which the crime was committed. It was only by recognizing the nature of this disorder that we were able to furnish the authorities with intelligent information concerning the prognosis of the case, and which the course of the disorder corroborated in every detail. By recognizing the fact that these disorders follow in the wake and as a consequence of the criminal act, the possibility of considering the man insane at the time of the commission of the act is obviated in a large measure.

Case VI.—R. S. C., a white male, æt. 48 years, who is now serving a life sentence for murder. One brother and one sister died of tuberculosis. Another sister and two maternal aunts were insane. Father alcoholic. Patient has always been regarded as rather sickly. Had the usual diseases of childhood and has been subject all his lifetime to frequent headaches. His school career was very irregular in character and he never reached beyond the elementary subjects. Socially, he belonged to a very ordinary

stock of frontiersmen and his chief occuption consisted of farming and certain minor speculations. He apparently led an honest and more or less industrious life. Married in 1886, and his conjugal career is uneventful. In March, 1901, he moved to Addington, Indian Territory. This was a newly established frontier town and he had bought sometime previously several lots there, intending to establish himself in the lumber business. Soon after this he got into some financial difficulty with a town site boomer and finally, in a fit of passion, shot and killed the latter and wounded a relative of his own. He was admitted to the Government Hospital for the Insane, December 13, 1901, from the Indian Territory. From the medical certificate which accompanied him on admission, it appeared that soon after the commission of the crime the patient began to show evidences of insanity by incoherent talk, false ideas, nervousness and outbursts of vicious excitement. Later this was followed by mutism, refusing to eat, and stupor. On admission to this hospital he was in a deep stupor, absolutely oblivious of everything about him. Eyes were wide open and staring, pupils dilated, voluntary movements markedly in abeyance. He was mute, except for an occasional incoherent mumbling to himself. He evidenced no initiative in feeding himself, but swallowed food when same was placed in his mouth. Habits were very untidy; involuntary evacuation of bladder and rectum was present. His mental content could not be determined at the time, as his replies were indistinct and monosyllabic, and were obtained only after much effort. He appeared to comprehend what was wanted of him, although this was not absolutely certain. His perception was very dull, ideation slow and laborious. His attention could be gained only with much effort and he had to be aroused first from a more or less complete stupor. Spontaneous speech was almost wholly absent, but occasionally he would utter a word or two about his wife and children. No delusions or hallucinations could be elicited. Physical examination showed him to be quite thin and emaciated. Gait slow and unsteady. Voluntary movements retarded. Knees trembled and knocked against each other. No paralyses or paresis noted. Marked general tremors were occasionally seen. Musculature well developed but flaccid. All deep reflexes diminished. Cremasteric absent. Other superficial reflexes were noted to be normal. Organic reflexes abolished. Involuntary urination and defecation. There was a systolic murmur present and a slight impairment of the upper lobe of right lung. Breath very offensive. He remained in this stuporous condition, leading more or less a passive existence, for about a month after admission. For two months following this he was quite agitated, and his outward reactions indicated that he was quite depressed. On April 25, about four and a half months after admission, when asked how long he had been in the hospital, he replied three days. From that time on he began to improve. Consciousness became more and more clear. In June he talked and acted quite rationally. He had a total amnesia of what had transpired during his stuporous and agitated states and a retrograde amnesia for several days prior to and including the commission of the murder. He continued clear mentally and in a more or less normal state until the latter part of

November, 1902, when he again went into a stupor. From this time until the latter part of April, 1903, he had alternating periods of stupor and lucidity, with amnesia for the stuporous states. On June 21, 1903, he was discharged as recovered and returned to the Indian Territory to undergo trial for his offence. Unfortunately no mention is made in the history of any possible relation between his periodic stuporous states and any environmental condition which may have provoked these, nor does there appear any mention in the history of the degree of insight, if any, the patient possessed upon his release from the institution.

He remained in jail at Ardmore, I. T., until April 8, 1904, when he was tried and found guilty of murder in the first degree. He was then returned to jail and after about a year's sojourn there he was sentenced to life imprisonment and transferred to the United States Penitentiary at Leavenworth. He was readmitted to the Government Hospital for the Insane on March 25, 1906, from the United States Penitentiary at Leavenworth. No medical certificate accompanied him on admission and it is, therefore, impossible to set even an approximate date for the onset of his present mental disorder; but inasmuch as he had not been in prison even a year before his transfer to our hospital, and as it usually takes several months before the required legal proceedings are gone over, his mental disorder must have set in quite soon after his confinement to the penitentiary.

He was again in a stuporous condition on his present admission to the hospital, and absolutely oblivious of his surroungings. For about twenty-four hours he was wholly inaccessible, would not reply when spoken to and had to be aroused from a sort of lethargic state before his attention could be gained at all. On the following day consciousness cleared up to some extent and he recognized some of the attendants whom he knew on his previous admission. He remained, however, more or less confused for several days, after which his mental horizon became clear, and simultaneously with this delusions of suspicion and persecution became evident. He did not know how long he had been in this confused state and had a complete amnesia for the entire period. Stated that he had been poisoned and that attempts had been made to kill him at the penitentiary. He knew he had been doped any number of times. Aside from this paranoid complex he had a complete left-sided functional hemiplegia, with all the concomitant signs. Left visual field considerably contracted. From May, 1906, until February, 1907, he had a number of stuporous periods, during which he was confined to bed from a few days to a week at a time. At these times he would lie with a vacant and staring expression of face and questioning would often fail to elicit any reply. At times he would partake only of liquid nourishment, then again he would have to be spoon fed. During his lucid intervals he would be up and about and more or less cheerful. Occasionally played games with his fellow patients. He continued to be very suspicious, frequently spoke of being doped and poisoned. Refused to take medicine and at times refused to take nourishment because he believed it to be doped. A stenogram of February 10,

1907, shows him to have acquired some grandiose ideas and to be still disoriented to a large extent. Some of his replies were absolutely irrelevant. For instance, when asked how long he had been here, he replied, "If I came on March 25, I have been here for three hundred and sixty-five thousand days. It is reasonable but you wouldn't understand it. When a man is answering for something he should not answer for every day amounts to a thousand years with the Lord." He stated that he knew that attempts were being constantly made to affect him with chemical substances; these were put in his food and rubbed on the walls of his room, making him dizzy and giving him a sort of peculiar feeling, etc. He could hear of things occurring in distant places and even in foreign countries, just as though he were there. He could tell what was going to happen; had no trouble at all to look into the future. He attributed this ability to some superhuman power, but which was natural to him. This power was bestowed upon him by the superhuman power itself. In prison every possible means were used to kill him, but without success. They even tried to chloroform him for a day and a night but could not kill him.

May, 1907.—Still delusional, hyochondriacal; paralysis very much improved. Complained at times of quiverings in the right extremities and a numbness on the left side. August, 1907, has been again in a stuporous state for four days. Still entertains paranoid ideas, hyochondriacal. This was followed by a lucid period, which lasted until November 25th, when he again went into a profound stupor and became totally oblivious of everything about him. Recovered after a week with a complete amnesia for the entire period. April, 1909, very much disturbed for about a week. Complained that the physicians and attendants were torturing him in order to drive him insane. Called them brutes and threatened to starve himself to death. Neurological examination December 1909—hemiplegia almost entirely well, but numerous physical stigmata still persist. Has been uninterruptedly clear mentally since his last stuporous state in November, 1908.

January, 1911.—Clear mentally. Answers questions coherently and readily. Attention easily gained and held without difficulty. Memory fair for both recent and remote events, with complete amnestic gaps for the stuporous periods. He shows the characteristic hysterical make-up. He is morbidly suggestible and suspicious. He is markedly egotistical, becomes easily irritated on the least provocation. Is extremely hypochondriacal and shows a marked tendency to the exaggeration of actual ills. Constantly laments his fate of being compelled to stay in a place of this sort, which is a thousand times worse than a prison. Is certain that his trial was crooked and irregular and that he had not been given a fair chance. His sentence is inhuman and unjust, as he was not responsible for the crime he committed; he remembers nothing of the occurrence and consequently must have been insane at the time. He is inclined to a great deal of fantastical day dreaming, writes poetry and religious dissertations. He is constantly bewailing his unfortunate lot in letters to people in high station, imploring their compassion with the poor down-trodden martyr.

Is clear mentally throughout and no definite delusions or hallucinations can be elicited. His morbid suspiciousness, however, lends him to interpret various occurrences in his environment in a more or less delusional manner. August, 1911. No change from the above note except that the physical stigmata have almost completely disappeared. Patient has an adequate amount of insight into his stuporous state, but does not realize that his entire make-up is more or less pathological in character.

We are dealing here with an individual who to start with comes from a badly tainted family. He leads an honest, more or less industrious life, until one day, in a fit of passion, he shoots and kills a man with whom he has some financial differences. Being uncorrupted and of a non-criminal make-up, the enormity of his crime suddenly dawns upon him with its full force. He is unable to withstand the emotional shock which the realization of his deed provokes, breaks down under the stress, and develops a mental disorder. He is removed to a hospital and under the salutary influence of the new environment gradually recovers his normal mental health. Simultaneously with this he begins to nourish the hope that he may escape punishment for his deed. The amnesia for the period during which the crime was committed lends support to his optimistic views concerning the outcome of the case, and his mind becomes in consequence wholly taken up with the idea of being acquitted of the murder charge. He remembers nothing of the deed, and therefore must have been absolutely unaware of what he was doing at the time. His hopes are shattered with a crash when he is found guilty and sentenced to life imprisonment. His nervous system is unable to withstand this blow and it yields the second time, only in a more pronounced manner.

One need not enter into a lengthy discussion in order to show that we have here a mental disorder, the origin of which can be definitely traced to psychic causes, namely, the emotional shock accompanying the crime and conviction. Cause and effect are clearly in evidence here. We have before us a well-defined psychogenetic psychosis. In addition to this the course of this man's mental disturbance was influenced to such an extent by his immediate environment that one could practically shape the symptomatology thereof at will. Only recently, after a prolonged period of a state which might be considered almost normal to the individual, he induced the attending physician to bring his case for consideration before the staff conference with a view to being

returned to prison. At this conference it was decided that in view of the very deleterious influence which prison life has had in the past upon this patient it would not be advisable at this date to send him to the penitentiary. Upon being told that he would have to remain at the hospital, patient again became morose, hypochondriacal, refused nourishment, and commenced to hold himself aloof from the other patients. His suspiciousness and vague persecutory ideas with reference to the personnel of the hospital became more pronounced, and he could see no other reason for being kept here except that the officials are continuing in their persecutions of him. I am convinced, without a doubt, that should this man be pardoned, all the manifestation which he now possesses, and which may be considered as pathologic in character, will at once disappear. The difference in the symptomatology of the two attacks serves to illustrate how difficult it is to positively state what relation these disorders have to hysteria. Here we have an individual whose past life fails to indicate anything which may be taken as of an hysterical character. He develops a psychogenetic disorder in consequence of his crime, the symptomatology of which shows little, if anything, of an hysterical nature. In due course of time he gets well, and after having thrust upon him a life sentence, again returns to us with a mental disorder, the chief feature of which is a functional hemiplegia. There is very little doubt that by studying a cross-section of his second attack we could easily place it under the group of hysteria. Considering, however, the history of this case *in toto*, we would have to proceed rather cautiously in judging of the hysterical element thereof.

Case VII.—G. W. W., white, male, æt. 26 years, whose hereditary history cannot be definitely determined. It appears that mother was a janitress in Boston, and had several children by various fathers. Patient grew up in an orphanage, and worked on farm until age of 18, when he drifted to Denver, Colorado and enlisted in the U. S. Navy. He served one enlistment with a good record, was a good sailor, and got along well in every respect. He re-enlisted the second time, about a year and a half ago, when at the instigation of a fellow sailor, he deserted from the Navy in company with the latter. On August 20, 1910, they held up the captain of a ship with the intention of obtaining some money which was stored on board the vessel. In the encounter the captain was killed by the patient's companion, who made his escape, while the patient was apprehended and held on a charge of murder. On August 24 he was placed in jail at Oakland, California. From the beginning he was regarded by the jail officials as

rather silly and defective. He did not appear to be very much interested in his case, and never spoke of his own initiative to his attorney about same. On May 8, 1911, he was seen for the first time by a psychiatrist. He was then found to be very distractible and inattentive, seemed suspicious and excited, and assumed stiff attitudes. He was well oriented, and recognized that he was on trial for murder. It might be mentioned here that although the jail officials apparently noted from the first that the patient was not right, the legal proceedings were continued, and it was only the 4th or 5th day of his trial that the judge's and jury's attention was called to the fact that the patient was insane, as could be seen from his conduct and behavior at the trial. A psychiatrist was then called in and he pronounced the patient as insane, whereupon the proceedings were stopped at this juncture. Examination at that time revealed the following: General sensation markedly reduced; hypalgesia, he allowed needles to be stuck in his tongue without flinching; walked in a stiff and stooping fashion; no Romberg; moderate vaso-motor stasis, with blueish, cold hands. Gait uncharacteristic. Eyes reacted to light, directly and consensually, and to accommodation. Patella, Achilles and arm reflexes markedly exaggerated and equal. No foot clonis, no Babinsky; abdominal reflexes present, cremasteric not elicited; catalepsy not always present.

Mental Examination.—Attitude was variable, but was distinctly that of one in a stupor. Arms, hands, and legs placed in uncomfortable positions; would remain fixed indefinitely, i. e., so observed from 20 to 30 minutes. Did not resent liberties taken with him; smiled in a silly fashion at each person. Orientation perfect; no insight; hallucinations and delusions could not be elicited. Attention could only be gained with great difficulty, and held for a very short time. Retardation was present; movements were slow and stiff. When stimulated, however, he responded promptly, and had no retardation. Speech and writing showed nothing characteristic.

May 11.—Flexibilitas cerea more marked; mutism; retention of saliva; eats food voluntarily; bowels require frequent attention.

May 20.—Requires spoon feeding; sleeps well; remains always in bed in stiff attitudes.

June 1.—For three or four days refused food, except for one or two meals daily. At times suddenly surprises attendants by sensible remarks, as: Another patient said, "That is G. W. W.," and patient promptly replied, "No, it is Rip Van Winkle." Negativistic signs more marked. Knows physician when eyes are pushed open. At times tries to whistle.

June 13.—For past week has been noisy and excited. When he hears dishes rattle, yells "Chow-chow" for a long time. Continued hot bath for one hour always relieves this excitement. Physical signs negative; Wassermann negative; blood and urinary analysis negative.

June 18.—Admitted to the Government Hospital for the Insane. The marshal who accompanied the patient from California to this institution states that the patient was resistive and negativistic; that he assumed various constrained attitudes; was untidy, mute, and refused food. All these tendencies were markedly influenced, however, by positive requests

of the marshal. When told that he would be chastised if he did not give up his untidy habits, this disappeared, etc. On admission to the G. H. I. the patient had to be carried into the ward, as he refused to walk. He was mute, negativistic, and assumed various uncomfortable and constrained attitudes. Every now and then he would snap at those who handled him, and this would be accompanied with a growl. He was very resistive to the taking of a bath, and suddenly snapped at the attendants who cared for him. When reprimanded, however, by the Supervisor, and told that he would have to take the bath, he quietly underwent the procedure.

Physical Examination.—Pupils widely dilated. Face somewhat distorted. Pupillary reflexes normal; although limbs would remain in a fixed attitude when so placed, he did not evidence the typical flexibilitas cerea. It seems as though he anticipated the passive movements, and there was present a certain amount of voluntary intent. All superficial reflexes active; winced when pricked with a pin, but there was a decided hypalgesia present. He refused food; was mute, and apparently oblivious of everything about him. This, however, was only apparently so, as he showed by various acts that he was more or less aware of his surroundings. For instance, during the examination he suddenly snapped at the examiner, and upon the latter's discomfiture he emitted a momentary giggle. When feeding-tube was placed in his nose, preparatory to feeding, he jumped up, and said, "I'll drink it," and drank the entire contents of the pitcher. While some parts of his body remained absolutely fixed, restrained and immovable, his face was constantly undergoing various grimacing motions, accompanied now and then by the snapping of his jaws and a growl. During the following several nights he was very noisy, excitable, singing and shouting throughout the night. Mental content could not be determined at this date.

June 28, 1911.—He remains in same apparent stuporous and catatonic attitude. For past few days has exhibited various childish and silly acts of a meaningless and monotonous nature. Still mute, except for an occasional growl. Became very untidy to-day, but when reprimanded and told that he must use the toilet he did so.

July 1.—Patient has been very noisy on several occasions in the past few days, but always becomes quiet when requested to do so. Continues negativistic, stuporous, and attitudinizing. To-day he was overheard saying, "I am a monkey; want to go out in the yard and sit on the benches; there was no plea of insanity; who are those boys? Come in boys; water, won't drink it because there is poison in it, it looks good, so try it; don't believe there is anything in it." He persevered in repeating these phrases.

July 2.—Sang all morning in an undertone. Would stop singing and recommence his facial grimaces when anyone entered his room.

July 3.—For the first time since admission patient answered the examiner to questions.

Q. "What is your name?"

A. "George Washington."

Q. "How old are you?"
A. "36."
Q. "When born?"
A. "1884."
Q. "Occupation?"
A. "Farmer."
Q. "Where born?"
A. "Around Boston."
Q. "What day is this?"
A. "Someone says Tuesday."
Q. "What date?"
A. "June 17, 1911."
Q. "How long have you been here?"
A. "I cannot tell you."
Q. "What is the name of this place?"
A. "U. S. Hospital."
Q. "Who brought you here?"
A. "Can't tell you, he looks like a monkey."
Q. "How long did it take you to get here?"
A. "One night, and twenty-four hours."
Q. "When did you come here?"
A. "I cannot tell you when I did come here."
Q. "Don't you really know the name of this place?"
A. "Well, sailors in the Navy call it the "Red House."
Q. "Where is it located?"
A. "Washington, D. C."
Q. "What sort of a place is it?"
A. "Why, it's as good as any place else."
Q. "Who are these people about you?"
A. "They might be soldiers; what are they out there for?"
Q. "Is there anything wrong with them?"
A. "How should I know."
Q. "Are any of them insane?"
A. "Darn'd if I know."
Q. "How do you feel?"
A. "How did I get cured of my headache? I'll stick a pitchfork through you, and if a pitchfork goes through you it will go through me too."
Q. "Are you sick?"
A. "I was sick; had a pain in the head."
Q. "How do you feel now?"
A. "Oh, pretty good."
Q. "Is there any thing wrong with your mind?"
A. "I don't know, I can't tell you."
Q. "Do you hear any strange noises or voices?"
A. "Can you go over to that tree? Sounds like a baby squealing; it's the man that choked the baby."

Q. "Do you ever see strange things?"

A. "Did I ever see strange things? I might read about them in the magazine."

Q. "Do you hear voices?"

A. "I hear voices say to you: 'You are not guilty.'"

Q. "How much money are you worth?"

A. "$100; I'll give it to you for my life."

As will be seen from the foregoing stenogram, the patient is only partially oriented, perhaps more so than he shows, because of his tendency to answer questions in a sort of careless manner. There is a slight suggestion of "by speaking" (Vorbeireden). The stenogram also suggests the possibility of the existence of fallacious sense perceptions. Of the utmost importance, however, for our consideration, is the fact that the occurrence which brought about the mental breakdown plays an important role in the consciousness of the patient. Amid what may be considered an almost total oblivion to his immediate environment, he hears the voices tell the examiner that he is not guilty, he would give the $100 which he possesses for his life. These are unmistakable signs of the psychogenetic nature of the disorder.

July 31.—Patient is well oriented, talks in a retarded manner; questions are answered for the most part correctly; occasionally, only nearly correct. His memory is good for remote events, but very much clouded for events which have transpired since the commission of the crime. Partial insight is present. He realizes that there must have been something wrong with him. Emotionally not deteriorated. Refuses to discuss his crime, saying it makes him feel bad; talks in a childish, affected tone of voice, and undergoes various grimacing movements; gives frequent evidence of being fully aware of occurrences in his environment; talks and eats voluntarily and is tidy in habits. Occasionally laughs in a silly, affected manner. Flexibilitas cerea and catalepsy entirely disappeared; gained considerably in weight; continues to show marked tendency to be influenced by occurrences in his environment. In general, shows a decided improvement in his condition.

We are dealing here with an individual whose past career is uneventful, as far as is known. He is charged with murder, and upon being tried for same develops a mental disorder. The symptomatology of his psychosis could easily be mistaken for that of catatonic praecox, and, as a matter of fact, had been so diagnosed by the first observer. In studying the case more thoroughly, however, it becomes unmistakably evident that we are not dealing here with a case of catatonia. In the first place, the immediate relation between the emotional shock of the crime of murder and the probable punishment for same, and the development of the mental disorder, must be taken into consideration. This is not a mere

accidental relationship. But even if we grant that this point cannot be definitely decided, the psychogenetic character of this case cannot be doubted when we remember how the entire symptomatology is absolutely dependent upon and influenced by occurrences in the patient's environment. He refuses to eat, a symptom very common in catatonia, but it is indeed a rare occurrence for a catatonic in the midst of a negativistic stupor and mutism to say, "I'll drink it," and actually drink voluntarily the entire contents of the pitcher in order to avoid tube-feeding. He is untidy in his habits, another common catatonic characteristic, but is it to be expected that a catatonic, in the height of his disorder, will abstain from his filthy habits when threatened to be punished for the same? Many more instances of similar nature could be cited in this case.

Another feature which removes all doubt of the psychogenetic nature of this disorder is the important part which the mental experience which was active in the production of the disorder played in the fashioning of the symptomatology of the same. I alluded before to the patient's answer to the question of whether he heard voices.

The disorder itself, as far as the symptomatology is concerned, is not absolutely typical of any one of the acute psychogenetic states. It partakes of Kutner's "catatonic states in degenerates" as well as Raecke's confusional-hallucinatory disturbances in these individuals. That the patient can be classed as one having a degenerative soil is not at all certain in this case.

I have considered briefly the importance of a proper recognition of these cases from the view-point of rendering a proper prognosis. There is another important question which must be discussed in connection with these cases and that is the question of malingering. Picture to yourself an individual, who, to all appearances, has led a normal existence, and never showed anything mentally which might be considered as pathologic. He commits a crime, and upon being arrested or upon being placed on trial for his offense, suddenly lapses into a condition of apparently complete dementia. The man, who formerly showed nothing in his conduct and behavior indicative of a mental disorder, suddenly changes into a state where he does not know his name, age, or his whereabouts. His answers to questions are irrelevant and of a markedly silly coloring. He

begins to act in a childish, affected manner, executing many silly, meaningless acts, or he may break out in a wild furious excitement, loudly proclaiming his innocence, and threatening those who arrested him. In addition to this, it is noted that this apparently pathologic condition can be definitely influenced by using strict and positive measures. The untidy habits of the patient may be corrected by urging or threats. The man who has been mute and refuses to eat can be made to talk and eat voluntarily by threatening him with tube-feeding. Furthermore, in the midst of this apparently total dementia, total blocking of all thought processes, the patient frequently surprises those about him by very sensible remarks of a very clever and pertinent nature, indicating that although apparently oblivious of his environment, he knows what is going on about him.

A picture like this may readily arouse the suspicion that we are dealing with a malingerer, and, indeed, some very prominent German psychiatrists have reported as malingerers cases similar to these. The trained psychiatrist, if unfamiliar with this class of cases, will find himself at a loss to know under what known group of mental disorders to place this condition, as it will at once become apparent to him that it does not fit into any of the well-known psychoses.

In defense of the genuineness of the psychotic manifestations of these patients, I would recall again the transitory mental disturbances of students undergoing examinations. The genuine loss of all knowledge of well-known facts which the old time strict and severe schoolmasters frequently provoked in school children, differs very little from the pseudo-dementia with which we are dealing here. It concerns a similar total blocking and inhibition of all thought processes, and, like all psychogenetic disorders, has a tendency to disappear upon the removal of the causative factor.

Still, nobody would think for one moment that the child malingers when it is unable to answer questions, though these might concern well-known facts. The consequences of failure to recognize this acute prison-psychotic-complex as a genuine mental disorder may prove to be very disastrous when we remember to what extent the symptomatology of these psychoses is dependent upon environmental conditions.

The Degenerative Psychoses.

I have considered thus far those psychogenetic mental disorders, the etiologic factor of which consisted of a single, more or less isolated emotional occurrence. We have seen that the majority of these patients showed very little, if anything, in their past life which was in any way incompatible with leading a more or less successful existence in the community in which they lived. These patients, we might say, would never have been brought to the attention of the psychiatrist had it not been for the occurrence in their life of an experience which provoked a mental breakdown, and it is this class of cases to whom the dictum of Birnbaum can hardly be applied without modification.

I will now consider a group of cases, in whom the degenerative soil is so prominent that they have been properly called "Psychoses of Degeneracy." They should, however, be considered here, because the various psychotic manifestations of these individuals are purely psychogenetic in nature, and evoked by a certain unfavorable milieu in which the individual was placed. As my material is derived from the criminal department of the G. H. I., the causative factor in these cases will again be found to be imprisonment. These cases differ from the so-called acute prison-psychotic-complex in that the etiologic factor does not consist in a single emotional experience. We are not dealing here with individuals in whom the commission of a crime is an accidental occurrence in their life, that is, still uncorrupted individuals upon whom the criminal act in itself might act in a deleterious manner. The patients belonging to this group are, as a rule, old offenders, who have long been hardened to crime, and whose entire life is an uninterrupted chain of conflicts with the law. To this group also belong those high-strung individuals with early anti-social tendencies, who from childhood show a marked degree of egotism and self-love; who are very vindictive and revengeful in their reaction to frictions in social life. Upon falling into the hands of the law, they are incapable of adjustment to the new situation, react in an insane and wild manner to the prison routine, and, in consequence, frequently commit grave offenses during imprisonment.

We owe our present knowledge of the psychopathology of these

individuals to the excellent work of the followers of the great Magnan, who contributed so richly to the study of degeneracy.

Siefert (15) was the first one to clearly differentiate the purely endogenetic disorders from those dependent upon a degenerative soil, and evoked exclusively by outside influences. He divided the eighty-seven cases of psychoses in criminals studied by him into two distinct groups, namely, the real psychoses and the degenerative psychoses. Under the former (32) he places the well-known forms of dementia praecox, epilepsy, paresis, etc. These, according to him, are not in the least influenced by the milieu in which they occur (in this instance, prison environment). His 54 cases of degenerative psychoses on the other hand, were characterized above all by the fact that they stood in the most intimate relations with the environment in which they occurred, and were wholly influenced by the same. The pathologic, degenerative soil which permitted of the development of the psychosis in these individuals consisted of irritability, lability, autochthonous fluctuations of mood, fantastic day dreaming, a heightened subjectivity to the environment, inability to form correct critical judgment concerning unpleasant occurrences about them and a strong tendency to suggestibility. On the physical side these patients were subject to headaches, migraine, restlessness and anxiety, often associated with disturbances of heart action, hypochondriacal complaints, and a tendency to become easily tired upon physical or psychic exertion. They also showed, as a rule, intolerance for alcohol, and were wont to react to alcoholism in a strongly pathologic manner.

Siefert subdivides his 54 cases of degenerative prison psychoses into the following groups:

First: Hysterical degenerative state. These consist of undoubted cases of grave hysteria, with convulsions, physical stigmata, endogenous states of ill-temper, confusional states, Ganser twilight syndromes, etc.

Second: Simple degenerative states. These differ from the preceding group in that hysterical stigmata are wanting. These patients are subject to severe maniacal outbreaks, motor excitements, mutism, attacks of anxious, delirious states, with confusion, etc.

Third: Fantastic degenerative forms. This group concerns markedly degenerated individuals with a pathologically exag-

gerated imaginative faculty, a strong auto-suggestibility, a tendency to deceit and lying, to inherent fluctuations of mood and hysterical stigmata. On this basis there develop conditions of pseudologia-fantastica, systematized delusional formations of all sorts, delirious psychoses, etc.

Fourth: Paranoid degenerative forms. This group he again subdivides into the querulent and hallucinatory paranoid forms. The former may resemble the typical "Querulantenwahn," a psychosis artificially built up out of extranous circumstances, and one which rarely develops in freedom, but is of very frequent occurrence in prison. The hallucinatory paranoid form consists of fallacious sense perceptions and delusions of a persecutory nature, often substantiated by a strongly hypochondriacal element; in short, a picture which simulates very closely the real paranoid state.

Fifth: Prison psychotic states with simulated symptoms.

Sixth: Dementia-like processes. The individuals belonging to this group are habitual criminals in whom the criminal tendencies become evident at a very early period in life, and who, without giving distinct evidence in their past history of a mental disturbance, develop after prolonged confinement a progressive change of character which eventually leads to frequent rebellious outbreaks against the prison management. They become absolutely unmanageable, neglect their work and duties, and finally have to be transferred to an insane asylum. Here they show nothing characteristic of the well-known dementing processes, as hebephrenia, for example; but very frequently, although quite young, their entire manner and behavior suggest a certain dilapidation and deterioration.

Siefert considers the above-mentioned disease processes as entirely dependent upon and provoked by prison life in individuals with a tendency to mental deterioration. He comes to the conclusion that the prison psychoses are reactions of pathologic, nervous organizations to definite deleterious conditions of life. They are nothing more than irradiations, distortions, and new creations on the same degenerative soil which also conditioned the crime.

The importance of Siefert's momentous work cannot be doubted, but whether he was justified in his many subdivisions of the degenerative states is questionable. His own description of the various forms immediately suggests the difficulty of clearly differentiating one from the other.

Bonhoeffer (16), in a monograph devoted to the subject, endeavors to establish the existence, on the basis of degeneracy, of acute psychotic processes which do not belong to either the manic-depressive, hysterical, or epileptic temperaments, which cannot be placed under any of the known forms of dementia praecox, and which develop as wholly independent psychotic manifestations in particularly predisposed individuals. The material which served for his thesis was gathered from the Berlin Observation Ward for Criminals, among the inmates of which he found a great number of degenerative psychoses. In a recent work on the subject of psychogenesis he upholds his former views, and believes he has been able to separate his cases into three distinct groups. The first group comprises certain unstable individuals who show a tendency to the development of simple paranoid psychoses. It concerns patients of a very labile make-up with increased affective reactions, with marked tendencies to impulsions and anti-social acts. These cases are characterized by the fact that they do not concern psychogenetic psychotic exaggerations of a certain temperamental predisposition, but psychically evoked disease-states which appear to be irreconcilably opposed to the original personality.

He calls attention to the epileptic seizures of these individuals, which have been so ably described by Bratz (17). In contradistinction to the genuine endogenetic epilepsy, these patients manifest epileptic seizures as reactions to situations purely psychic in nature. In them, without ever resulting in epileptic dementia, there occur along with the epileptic seizures attacks of unconciousness, of excitement, dream states, and porio-maniacal outbreaks. They differ from the genuine epilepsy by the absence of the characteristic dementia, of attacks of *petit-mal*, and by the fact that the seizures are never purely endogenous in origin. They are always due to extraneous causes, eminently such of a psychic nature. He believes that more frequently even than actual epileptic seizures are the dream states, excitements, and maniacal outbreaks brought about in these individuals by emotional experiences, and as a result of certain ideas and concepts. He places in this group the proverbial "wild man," the man who goes into a frenzy upon seeing a policeman, etc. Although alcohol may in these individuals prepare the way, the immediate causative factor, however, is the emotional experience, or the recollection of such an experience.

These psychogenetic excitements of degenerates often simulate symptomatologically genuine epilepsy so far as the ferocity of the excitement and the state of consciousness are concerned. In some cases the retention of suggestibility during the attacks shows clearly the psychogenetic character of the disorder, while in others the tendency toward the theatrical and exaggeration is so marked that we are forced to think of an hysterical component. Certain slight symptomathologic features of these psychogenetic states of excitement in degenerates appear to furnish a differentiating point between them and the true epileptic condition. Bonhoeffer refers to the strong tendency to disgust-evoking manifestations, to copropractice which manifest themselves in the soiling of the walls and face with excrements, the drinking of urine, etc. Another characteristic is the frequent total misunderstanding of the situation by these individuals in that they consider themselves to be threatened with impending grave physical danger. In consequence of this they manifest a certain over-aggressiveness, which goes far beyond mere protective reactions, and manifests itself in a senseless breaking and demolishing of furniture. These individuals can be easily distinguished by their superficial intellectual endowment, by a tendency to change of occupation, and early criminality. During imprisonment and under the influence of the stress incident thereto, they develop an acute paranoid symptom-complex, a delirium of reference, accompanied by ideas of prejudice, isolated elementary hallucinations, an irresistible desire to a depressive recapitulation of their past, and a nervous, irritable temper. Consciousness is not clouded, and they remain perfectly oriented in all spheres. The duration of the disorder may vary from a few months to two years, with occasional intermissions. The delusional formation continues only for a short period, and in no instance leads to a retrospective change of the content of consciousness. Very frequently the process subsides upon the removal of the patient into a new environment without leaving any change in the personality of the individual. Insight is not always perfect. The delirium of reference and prejudicial ideas concerning the prison personnel may remain uncorrected.

The cases belonging to his second group are those well known pestilent individuals who from childhood show an abnormally affective reaction to frictions in social life, in so far as their highly

exaggerated, egocentric self-consciouness permits them to endow every unpleasant experience with a personal note of prejudice. They are the poor martyrs, who somehow never seem to get what is coming to them in this world, who are ever ready to assert their rights and leave no stone unturned until they receive what they consider full justice. Such individuals may pass through life, if fortunate enough, without developing a real psychosis. They are then merely burdensome and uncheering elements within their narrow social sphere. Should they, however, meet with an experience, which to them appears as an injustice, they may at once develop typical paranoid pictures, the characteristic feature of which is that the psychic experience which forms the origin of the trouble remains always in the foreground. Bonhoeffer identifies these conditions with Wernicke's psychoses of hyperquantivalent ideas. He very justly says: "The narrower the sphere of activity in which these individuals live, the more frequent the opportunities for conflict are offered by law, discipline, and subordination, the easier it is to develop a psychotic exacerbation of the abnormal temperament even on a lesser pathologic basis. This is the reason why officialdom and especially the narrow limits of prison life bring out so forcibly these psychogenetic disorders. In prisoners the psychogenetic character of the disorder becomes especially apparent. One sees how in many cases the transfer from one prison to another, to an observation station, or to an insane asylum puts an end to the process. In certain instances the process seems to revive itself again when the individual is placed in a similar environment."

Of Bonhoeffer's three subdivisions of degenerative states the preceding one would as a whole appear to me to be especially deserving of a separate classification. Anyone who has had any experience with insane criminals will recall that group of cases in whom the entire psychosis seems to be more or less centered about a certain idea; in most instances, about the idea of not having received a just trial. These individuals, without showing any intellectual impairment, in fact without showing any characteristic which would fit their mental disturbance into any of the known psychoses, constantly evidence a sort of freely floating paranoid atmosphere, a paranoid trend which is exclusively directed against those who had anything to do with their conviction and safekeeping.

The most trivial occurrences in their environment are endowed by them with a personal note of prejudice. The delay of a letter, the refusal to grant some of their impossible requests, an attendant's accidental failure to sweeten their coffee sufficiently, the slightest deviation from the routine greeting of the visiting physician; in short, any such trival insignificant occurrence is at once endowed with a special meaning, and explained in a more or less delusional manner. Yet these individuals can reason in a perfectly rational manner on any subject which is not concerned with their conviction or confinement. They are as a rule intellectually bright and keen, and fail to show any evidence of emotional deterioration. On the contrary their emotions are of such fine and sensitive nature that incidents which an ordinary individual would overlook entirely, offend them to a marked degree, and are reacted to by them in a very decisive manner. Indeed, one frequently asks himself whether their persecutory ideas deserve to be endowed with the value of actual delusions. I fully agree with Sturrock (18) when he says, "If I refuse to allow a prisoner full scope because he has lifted a knife from the table with which to attack the charge warder, I do not call it a delusion of persecution if he spends the night threatening to murder me because I do not give him justice." One must remember that this is in a measure the normal attitude of the captive towards the captor, and can be seen in a more or less pronounced degree among criminals enjoying a short respite from the law. The essential point here is not the so-called psychosis, but the soil which made its development possible. Not all prisoners, by far, react in this manner to the prison environment. It is only those degenerative individuals who have shown this well marked paranoid trend all their lifetime who furnish these cases. As a general rule these conditions are seen in habitual offenders whose entire life has been a round of conflicts with everything they come in contact with, and who, outside of prison, figure chiefly in the saloon and gambling house brawls.

That these conditions deserve a more definite classification than the nondescript paranoid state cannot be doubted. These paranoid manifestations are distinct reactions to a definite situation, in this instance, conviction and imprisonment, of individuals whose peculiarly degenerative make-up makes such reactions possible. The question of the particular coloring which these disorders may

assume can only take a secondary position to that of the character or make-up with which we are dealing.

Bonhoeffer further speaks of a certain hysterical element in these cases, but does not believe that on this account these paranoid manifestations should be considered as hysterical. He rather believes that they are more closely allied to the epileptoid temperament. The hysterical component manifests itself either in hysterical stigmata or, as has often appeared to him, in the fact that the falsifications of memory which these individuals frequently manifest concern themselves solely with the simple over-valued paranoid ideas, and lead to a complete blocking out of unpleasant recollections of the individual's past career. Thus, previous sentences, imprisonments, etc., are totally forgotten. In this, perhaps, we might see the well-known wish factor of hysteria.

The cases which comprise his third group show such a varying symptomatology that it is difficult to form an exact idea of just what characterizes them.

After perusing the work of Bonhoeffer, one feels that the author's endeavors to subdivide his material into this or that group are somewhat artificial. Granted that we are dealing with mental disorders, whose existence can be possible only by a certain degenerative predisposition, the question arises, "Of how much practical value is this constant endeavor at classification and subdivision of the psychotic manifestations which these individuals show!" One must acknowledge that the salient feature here is not the particular coloring which these psychoses assume, but, as we have stated before, the soil upon which they develop. At most, we might say that the symptomatology of these psychoses would depend on the question whether it is the ideational sphere which is mostly concerned or the affective sphere. Turning to Willmann's excellent contribution to this subject one again meets with the same endeavors at subdivision and classification. Lack of space will not permit us to enter into an extensive discussion of this author's work. We have already indicated here and there in passing some of the essential points in the views of this author.

One turns with quite a degree of relief to the momentous work of Birnbaum (19) on the Psychoses of Degeneracy. As far as can be ascertained the author does not endeavor to subdivide his degenerative states into so many types and forms. According to

him, the essential characteristics of the degenerative psychoses—namely, the extraordinary determinability and influence which outside impressions have upon the disorder, the mode of genesis and the psychological evolution of the delusions, etc.—may be attributed to the essential ear-marks of the degenerative character; that is, to the exaggerated autosuggestibility, the great instability of the existing conditions and mental pictures, the disharmony between the perceptive and imaginative capacities and the preponderance of a lively fantastic coloring to the dry thinking of these individuals. They do not form disease processes of a definite characteristic form, but episodic psychotic manifestations on a degenerative soil, and the manifold phases of the collective forms are to be considered as repeated fluctuations about the psychic equilibrium of these individuals. He further noted that the symptomatology of these disorders remained limited to a relatively well systematized delusional fabric, which, however, in contradistinction to paranoia, does not persist for any length of time, but disappears for certain definite reasons. They do not form any typical symptom-complex. The delusional ideas may take on any character; hallucinations may occur in all fields of the sensorium; consciousness may or may not be clouded, but is usually so in the beginning of the disorder. Recoveries are as a rule gradual, but may set in quite suddenly. Insight may or may not be present. The course of the disorder, like its symptomatology, offers nothing of a definite, characteristic nature. Thus we see that the distinguishing feature of Birnbaum's degenerative psychoses does not lie in their mode of appearance, in their symptomatology, but in the mechanism of their evolution and, above all, in their total dependence upon extraneous influences. They are typical psychogenetic disorders, the psychic etiology of which is potent not only in the incitation of the processes, but in the modeling and fashioning of them. Although Birnbaum notices the close relation that exists between these psychoses and the hysterical psychotic manifestations, he would separate them distinctly from hysteria.

Case IX.—A. C., colored female, æt. 32 on admission to the G. H. I. on June 18, 1909. Father died of dropsy; one brother was killed in a railroad accident; one sister suffered from St. Vitus' dance; another died of tuberculosis. Patient was born in Jamestown, Va.; was healthy as a child. Does not remember having the usual diseases of childhood; had a severe attack

of typhoid fever when quite young. Attended school until fourteen years of age, having reached the third grade. Upon leaving school she went to work as chambermaid and soon became addicted to the excessive use of alcohol, as a result of which she got into numerous fights and quarrels. In 1895, while intoxicated, she stabbed a man in the back and was sent to Albany Penitentiary for five years and eleven months. During her sojourn there she was sent to the Matteawan Hospital for Criminal Insane, where she remained forty-five days. Upon being discharged she returned to her home and lived with her mother, assisting her with washing and ironing, following which she led the life of a prostitute for about two years. In 1901 she was sentenced to thirty months imprisonment at Moundsville, Va., for theft. Previous to this she had been confined in the G. H. I. for about a month with an attack of delirium tremens. After the expiration of her sentence at Moundsville, she returned to Washington and soon after was again arrested for housebreaking and robbery and sentenced on two counts to twenty years imprisonment at Moundsville. While there she had more or less trouble all the time; had numerous fights with other colored women, in several of which she sustained injuries. On February 12th, 1907, while working in the sewing-room, she became implicated in a quarrel with another inmate, whom she stabbed in the left side of the neck with a pair of scissors. In describing the incident, she says, "I pushed them in as far as they would go, twisted them around, opened them and then pulled them out." The woman lived about five minutes after this. The quarrel presumably originated because her antagonist called her some name and accused her of having to serve a "young life sentence." She then told this woman to go back to Anacostia and get the baby she threw over the Anacostia Bridge, at which the latter became quite angry and attacked her with a pair of scissors, which culminated in the murder. A. C. was placed in a cell after this and the next day transferred to a dungeon, where she remained until her transfer to this Hospital. While in the dungeon she suffered a great deal with headaches and nervousness; she was absolutely isolated, no one came to her cell, she ate her meals through the bars. In this condition she remained about three months. She says she prayed a great deal during this period, because she was told that she might have to stand trial for murder, in which event they would surely hang her. She was admitted to this institution the first time on May 8, 1907, on a medical certificate, which stated that one sister died of pulmonary tuberculosis, and that another is now afflicted with chorea. The patient was addicted to the excessive use of alcohol and cocaine and is considered to be a sexual pervert. Ever since she was admitted to the penitentiary she has exhibited signs and symptoms of insanity; her present symptoms are described as ungovernable temper, attacks of extreme nervousness, attacks of fits resembling those of acute mania, with loss of judgment and complete disregard for the consequences of any of her acts. Delusions of persecution were also noted. Her mother stated that the patient throughout her lifetime would frequently have outbursts of temper, and her brother would tie her down during these attacks to prevent her from injuring members of the

family. Physical examination on the first admission was negative. Mentally she complained of being nervous and easily awakened at night; consciousness was clear; she was well oriented; no hallucinations or delusions could be elicited. Intellectually she appeared to be above the average negro in intelligence; she read and wrote, spelled correctly and used good English. Her memory was good for both past and recent events. Throughout her entire sojourn here she was oriented to time, place and person, and except for having stated at one time in a sort of careless and apparently indifferent way that she had heard some one calling her by name, and upon looking for the person could find no one, she manifested no hallucinatory disturbances. No delusional ideas were elaborated at any time. Her conduct throughout here was characterized by marked irritability at times; she frequently threatened to get even with the ward physician, saying she did not propose to fight open-handed any more and would not enter into a fight without a weapon. She frequently broke window lights without any apparent reason; often was very surly in manner; then again was pleasant and agreeable and assisted with the work on the ward. She assaulted several of the nurses when an attempt was made to restrain her, in order to prevent her breaking windows lights. When spoken to about these outbursts of temper she would deny all knowledge of them, saying that she never threatened or assaulted anyone. She was discharged as recovered on January 12, 1909, and returned to Moundsville Penitentiary. She was again admitted to the G. H. I. on June 18, 1909, on a medical certificate which stated that she was very irritable and had a mania for breaking windows; that she was suffering from delusions. No further evidences of insanity were given. On admission she was sullen and disagreeable, had a frown on her face, sat on a chair looking out of the window and was exacting in her demands. She requested to be removed to another ward, where she thought it would be livelier; asked for various medicines, etc. When told that her request could not be granted, she became very cross and abusive, making threats of things she would do. In the afternoon, scratched her arm with a pin and quite a flow of blood was produced, which necessitated restraint. At this she became very excited and endeavored to break the wristlets and get out of the room, proclaiming loudly that if she was going to have wristlets on she would rather be back at Moundsville. She was not very communicative concerning her return to the Hospital; told one of the nurses that she had "carried on high" to get back, and that Moundsville was "a hell of a place." The following day she begged continuously for hypodermics, complained of headache and tried to produce emesis by putting her finger down her æsophagus. When questioned, she answered promptly and intelligently, but in a sullen manner; stated that on her return to the penitentiary she was placed in a cell formerly occupied by the woman that she had killed, and that this made her nervous and frightened. She would not sleep on the bed provided, but used for sleeping purposes a box intended for a table. She said she cried and prayed a great deal until finally, after three weeks, she was transferred to another cell. She said that she behaved well and

caused no trouble after having been removed from the first cell and does not know why they transferred her over here. Her entire sojourn here on this occasion was characterized by irritability, impulsiveness and destructiveness to property. She was faultfinding to a great extent and threatened the life of some of those about her. She was surly, selfish and showed a marked tendency to lying. She was shrewd in her endeavors to get herself into the good graces of those in charge of her and on one occasion stated that she was pregnant, in order to receive more considerate treatment. This, like many other of her assertions, was false. She was oriented throughout; memory good; no hallucinations or delusions could be elicited; she was very unstable emotionally; reasoning and judgment were defective. Her entire symptomatology was controlled and fashioned almost wholly by her immediate environment. When refused a privilege, she would become surly, abusive and threatening to those about her, would destroy everything she could lay hands on, and attack the nurses when the opportunity was favorable. The granting of a privilege again would serve to keep her in a rather tranquil mood. She remained this time until June 21, 1910, when she was again returned to the penitentiary at Moundsville. From information obtained from some officials of that penitentiary, it appears that she is continuing to have her oldtime outbursts of temper, during which she becomes absolutely unmanageable, and the only way to deal with her seems to be to isolate her and leave her absolutely alone until she is over her disturbed state. Between these attacks she behaves quite well, but this behavior has to be encouraged by the granting of various privileges.

Case X.—J. J. M., æt. 24 years, white male, is a well-built young man, whose family history is unknown owing to his refusal to give same. He was born at Chester, S. C., in 1885. Childhood and school life uneventful as far as is known. He was a bright scholar of ordinary intellectual attainments. His industrial career, which began early in life, was, according to his statements, normal. He admits, however, losing several positions on account of outbreaks of temper during which he had fights with other employes. He had several gonorrheal infections, the first one at the age of fifteen; was infected with lues at a very early age. He used alcoholics to a certain extent, and admits having been intoxicated on numerous occasions. In 1906 he was struck on the head with a club by a policeman. Later in the same year he received an injury to the head during a street riot. Both of these injuries were accompanied by no untoward symptoms. In 1907 or 1908 he was struck on the head by an overhead pump while riding on top of a car. Was unconscious for some time afterwards, later got up and walked unassisted to a nearby station, where he took a train to Cincinnati. There he was confined to a hospital for ten days, undergoing treatment for this injury. He left the hospital one day without being properly discharged; had no ill after effects from this injury. In the summer of 1909 he was arrested in Washington, in company with another fellow, for robbery. They were both released on bond. The patient, how-

ever, left the jurisdiction, and when the police went to a nearby city to arrest him, he met them with a loaded pistol. After considerable effort he was finally subdued and arrested. His companion received a short term sentence, while the patient was committed to five years in the Leavenworth Penitentiary. At that time he was living on the earnings of a professional prostitute, to whom he claims he had been married for several years. From correspondence between him and this woman it appears that he fully sanctions her mode of life. Soon after his arrival at the prison the physician noted his excitable and irritable disposition, which became progressively aggravated, finally necessitating his transfer to the observation ward on December 9, 1910, a little over a month after his imprisonment. The records of the observation ward of the Leavenworth Hospital show the following:

December 12, 1910.—Patient says he is frightened and asks to go to bed; put to bed at 4 P. M.

December 22, 1910.—While nurse Miller was taking the afternoon temperatures of the several patients at the guard's desk, he was suddenly and viciously attacked by M., who began to beat Miller about the head and face, drawing blood. It was noted that M. and another prisoner had resolved themselves into a select coterie for the purpose of being loud and boisterous and disobeying the hospital rules generally. Not a day passes that some gross breach of prison discipline is not committed by them.

December 23, 1910.—M. told the nurse, "If my wife don't write pretty soon, I am going to jump off the landing and kill myself." He complained that the attendant and nurses are talking about him, and that he feels sometimes like going over and smashing some of them, adding, "I know I am a dam fool for thinking that they are fixing up against me, but I can't help it. I know I am going crazy; I wish I could kill myself, cut my throat or something." This patient is decidedly worse, easily excited, suspicious, hypersensitive, imagines persons are plotting against him. When in conversation, gesticulates with both hands, wags his head and looks wildly out of the eyes. A particular instance of his excitable temper is a startled wild look upon being awakened to have his temperature taken in the morning.

December 24, 1910.—Says he is scared of something, doesn't know what, and wants to go to bed. Continues to receive epilepsy tablets.

January 2, 1911.—Complains of pains through the head and acts as if frightened. His eyes have a glassy appearance and pupils are dilated. At times a suicidal mania attacks him, seemingly using all of his strength to overcome it.

His further sojourn there was characterized by maniacal outbursts, during which he would attack those about him. He showed an utter disregard for prison rules, absolutely refused to obey orders, and when an attempt was made to enforce these, his condition became noticeably aggravated, and the maniacal attacks more frequent. He frequently spoke of being frightened at something, of the attendants plotting against him, and persecuting him. During one of his maniacal depressions he made a superficial

cut on his neck with a piece of glass which necessitated the application of physical restraint. One day two physicians who examined him spoke in his presence of the advisability of operating upon his head. Following this he constantly spoke of his fear of being cut up by the physicians, whom he designated as a bunch of anarchists, and the elaboration of this fear remained the dominant feature of his mental disorder. He continued, however, to be profane, vicious and unruly in his behavior. His periodic outbursts of rage were as furious as formerly, he tore up his bed clothing and personal attire during these fits of anger, which continued to be more or less reactive in character. He is noted as having had several attacks of convulsive seizures, closely resembling epilepsy. Patient was admitted to the G. H. I. on April 7, 1911. On admission he was very nervous and apprehensive, would jump and become startled when touched or approached by anyone and when spoken to became highly wrought up emotionally. His body fairly shook with excitement, pupils dilated, face became flushed and he could hardly speak on account of the emotional upset. He spoke of having come from a hell, from a dungeon, where a bunch of anarchists were persecuting him, and were going to cut him up and operate on him, that he had heard them talk about it. He was imperfectly oriented, somewhat confused, and to all appearances lacked full appreciation of his new environment. He quieted down, however, at the close of the day and slept well during the night. Physically he was slightly emaciated. No neurological disturbances were noted except that he complained of headaches. When an attempt was made the following morning by a physician to examine him he flew into a rage, became highly emotional, profane and threatening, showed marked apprehensiveness and expressed the fear of being cut up. He reiterated the persecutions of him by the officials at the penitentiary, that he did not care what happened to him, whether he went to hell or heaven, etc. He spoke of killing himself before he would submit to an operation. He refused to eat, saying that the food was not fit to eat, and that he would refrain from taking nourishment until he was given better food. A visit from his wife served to appease him. When given a hospital night gown to wear he threw it away, saying he could not sleep in coarse clothing, and this had to be finally substituted by a silk one which his wife brought him. For two weeks following this he was allowed the freedom of the courtyard, where he was quiet and well-behaved, except when spoken to by the physician. At times he would turn with lightning suddenness into a maniacal state, and his paranoid ideas would come to the front, among which his fear of being operated upon was always predominant. At this time he had not completely transferred his paranoid ideas to the officials here. His clouded consciousness cleared up completely. He read the newspapers daily, took an active part in his immediate environment, and except for the periodic outbreaks of rage when talking to the physician he showed no outward conduct disorder. He was taking nourishment regularly ever since a special diet was ordered for him. After a sojourn of about a month, the attention of the officials was called to the fact that the patient was planning an escape by over-

powering the attendants, in which plot his wife, who was at that time an inmate of a disreputable house, was to assist him by furnishing him with a gun. It was thought advisable to take special precautions with the man, and consequently his freedom of the courtyard had to be curtailed, and he was confined to his room. This was immediately followed by a marked exacerbation of his psychotic manifestations. He became very unruly, abusive and threatening. His outbursts of fury assumed the character of an excited epileptic. It differed, however, from this in being accompanied by clear consciousness, and in not being endogenetic in their occurrence, but distinct reactive manifestations to definite situations. Every refusal of a request was followed by one of those outbreaks, during which he would be profane, abusive, destructive and violent, threatening to kill the officials who had anything to do with his safe-keeping, and would elaborate an ill defined general paranoid trend towards them. He was simply persecuted by a bunch of unchristian anarchists who were running this place; that they would see him in hell first before they would make him behave himself; that he is not here to please anybody except himself; that he recognizes no superiority other than Jesus Christ, etc. Conversely, the granting of a privilege served to bring him to a perfect calm, when he would talk in a rational and coherent manner, and be free from a psychotic manifestation. The granting of the privilege of seeing his wife served to get him to submit himself to a thorough examination, which could not be attempted before. The objective examination revealed no intelligence defect. His reasoning and judgment were unimpaired, memory good, and aside from his paranoid ideas, which consisted in his belief that the officials were persecuting him, and that they were trying to operate on his head, no psychotic manifestations could be determined. Hallucinations had not been evidenced at any time and he possessed no insight. Recently he requested the physician to administer him a dose of 606, for which he was very grateful. He also entered of late into an active correspondence with some attorneys in town with a view to having something done for his case. On July 15, 1911, he appeared before the staff conference of the medical officers of the hospital for the purpose of determining whether his condition was such as to warrant his transfer back to the penitentiary. Although having been tranquil and normal for several weeks prior to this, upon entering the examining room he at once became highly emotional, abusive and threatening, and everyone who saw him at that time was impressed with the great affective lability which the patient possessed. For a day or so following this experience he continued to be very emotional, irritable and boisterous. Later on his privileges were again presented to him and he resumed a tranquil state of mind, which existed until the time of his transfer to the prison on August 10, 1911. He told the supervisor who accompanied him to the depot that he intended to behave himself when he returned to prison, so that he might enjoy the benefit of his good term allowance and thus have his sentence shortened. Upon his return to the penitentiary he was immediately placed under observation on account of his peculiar behavior.

The records of that institution show the following:

August 16.—Became very profane during the afternoon and evening, declaring that the prison authorities were holding up his mail from his wife, and was very profane and vindictive in speaking of the officials.

August 17.—Cursing the prisoners of parole room I as they were coming in from exercise, stating that they were a lot of G.. d... s.., of b...., and that they were holding up his mail.

August 18.—Shouting and cursing through his window during the evening. Got out of bed at 2 A. M., and began to swear and fight an imaginary foe, keeping it up for two hours.

August 19.—Continues to use the most profane language he can towards the prisoners, or anyone whom he chances to see.

August 20.—Was very excitable and irritable during the day and evening. Attempted to throw his food in the guard's face, cursing the officials for keeping his wife away from him; claims that he can hear her calling him outside of his cell at night.

August 21.—Cursed the guard because he would not allow him to go out of isolation; sang and whistled during the evening.

August 22.—Very profane and vindictive in his accusations towards the prison officials.

August 23.—Denounced the guard as a black-hander, and said that the guard is bribing the prison officials to hold him in isolation, but that he will not give the guard a damned nickel.

August 29.—Actions and language continue along the same line except that they are growing progressively worse; cursing the officials, prisoners, etc.; claims they are keeping his wife away from him, and that his mail is being held up; is afraid of being murdered, and says that he is being kept here while his wife is starving; constantly uses loud and profane language.

August 30.—Prisoner whistled and sang during the evening, interspersed with very vile language.

August 31.—Became very violent to-day, cursing officials, claiming that he was being kept away from his wife and child, who were starving. Kept shouting, singing and cursing at intervals all day and far into the night.

September 7.—Continues to have periods of violence almost daily; has hallucinations that he is being haunted by some imaginary foe, whom he sees sitting on his bed when he wakes up at night—a red-headed fellow by the name of Smith. Says that he can hear his wife and child crying outside of his cell, and repeatedly requests that he be allowed to go home to them. Says that his wife and child are starving, and that the prison officials are trying to starve him. Complains of pains in his head, and that his eyes hurt him, and that he is going blind. He is inclined to be destructive of late, breaking his electric light globes, smashing stool, throwing magazines against window and cell bars.

September 14, 1911.—Says he knows that red-haired Smith is trying to steal his wife, and that he is following him all over the country; that he

powering the attendants, in which plot his wife, who was at that time an inmate of a disreputable house, was to assist him by furnishing him with a gun. It was thought advisable to take special precautions with the man, and consequently his freedom of the courtyard had to be curtailed, and he was confined to his room. This was immediately followed by a marked exacerbation of his psychotic manifestations. He became very unruly, abusive and threatening. His outbursts of fury assumed the character of an excited epileptic. It differed, however, from this in being accompanied by clear consciousness, and in not being endogenetic in their occurrence, but distinct reactive manifestations to definite situations. Every refusal of a request was followed by one of those outbreaks, during which he would be profane, abusive, destructive and violent, threatening to kill the officials who had anything to do with his safe-keeping, and would elaborate an ill defined general paranoid trend towards them. He was simply persecuted by a bunch of unchristian anarchists who were running this place; that they would see him in hell first before they would make him behave himself; that he is not here to please anybody except himself; that he recognizes no superiority other than Jesus Christ, etc. Conversely, the granting of a privilege served to bring him to a perfect calm, when he would talk in a rational and coherent manner, and be free from a psychotic manifestation. The granting of the privilege of seeing his wife served to get him to submit himself to a thorough examination, which could not be attempted before. The objective examination revealed no intelligence defect. His reasoning and judgment were unimpaired, memory good, and aside from his paranoid ideas, which consisted in his belief that the officials were persecuting him, and that they were trying to operate on his head, no psychotic manifestations could be determined. Hallucinations had not been evidenced at any time and he possessed no insight. Recently he requested the physician to administer him a dose of 606, for which he was very grateful. He also entered of late into an active correspondence with some attorneys in town with a view to having something done for his case. On July 15, 1911, he appeared before the staff conference of the medical officers of the hospital for the purpose of determining whether his condition was such as to warrant his transfer back to the penitentiary. Although having been tranquil and normal for several weeks prior to this, upon entering the examining room he at once became highly emotional, abusive and threatening, and everyone who saw him at that time was impressed with the great affective lability which the patient possessed. For a day or so following this experience he continued to be very emotional, irritable and boisterous. Later on his privileges were again presented to him and he resumed a tranquil state of mind, which existed until the time of his transfer to the prison on August 10, 1911. He told the supervisor who accompanied him to the depot that he intended to behave himself when he returned to prison, so that he might enjoy the benefit of his good term allowance and thus have his sentence shortened. Upon his return to the penitentiary he was immediately placed under observation on account of his peculiar behavior.

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September 14, 1911.—Says he knows that red-haired Smith is trying to steal his wife, and that he is following him all over the country; that he

was about to kill him in Jacksonville, Florida, but that he jumped out of a window. His violent attacks are becoming more severe and pronounced, and he requires constant watching to prevent him from doing himself bodily harm. He was also noted to have occasional mild attacks of *petit mal.*

On his way over to Washington from the penitentiary at Leavenworth, upon his second transfer to this institution, the patient had been shackled to another prisoner who was supposed to be suffering from pulmonary tuberculosis. M. kept on begging the guards to be separated from this prisoner, and this request was finally granted to him. While going through the State of Iowa he jumped out through the window of the moving train. He was handcuffed at the time. After having gone about thirty miles he was recaptured. He had removed handcuffs soon after his escape from the train.

September 27.—On admission the patient limped and complained of great pain in both knees. Knees were swollen, bruised and discolored, and there was marked tenderness present on touching. Patient entered the ward quietly, recognized those about him, and answered questions rationally. Said that, aside from having been hurt in the knees, his left shoulder pained him a great deal. Upon being placed in bed he was asked by the examiner why he was sent here, to which he replied, "To get killed, I suppose." Further questions failed to elicit any answers, and the interview had to be discontinued.

September 28.—Patient answered the following questions to the attendant on the ward:

Q. "What is your name (full Christian name and surname)?"
A. "J. J. M."
Q. "How old are you?"
A. "25."
Q. "When were you born?"
A. "1885."
Q. "What is your occupation?"
A. "Railroad man."
Q. "Where were you born?"
A. "Charleston, South Carolina."
Q. "What day is this?"
A. "Don't know."
Q. "What month, date and year is it?"
A. "August, 1911. Don't know date of month."
Q. "What time is it?"
A. "Don't know."
Q. "Where did you come from?"
A. "Leavenworth."
Q. "Who brought you here?"
A. "Bunch of cut throats, Sons of ..... tried to starve me to death all the way down."

Q. "How long were you in coming?"
A. "Don't know."
Q. "When did you come?"
A. "Don't know what time it was."
Q. "What is the name of this place?"
A. "Don't know."
Q. "Where is it?"
A. "On an island, I guess, some damn thing across the river."
Q. "What sort of a place is this?"
A. "Mad-house."
Q. "Who are these people about you?"
A. "Here to murder me."
Q. "Is there anything wrong with them?"
A. "Nothing but black-hands anarchist."
Q. "Who am I?"
A. "Jack Stewart."
Q. "Why do you suppose I'm asking you all these questions?"
A. "Don't know."
Q. "Why were you sent here?"
A. "To be bumped off, I guess."
Q. "How do you feel?"
A. "Pretty bad this morning; my head hurts me."
Q. "Are you sad or happy?"
A. "Neither one."
Q. "Are you worried about something?"
A. "Why, sure I am."
Q. "Did anything strange happen to you for which you can't give yourself an account?"
A. "No."
Q. "Do you hear voices talking to you?"
A. "Yes, hear you talking to me now."
Q. "Do you see any strange things?"
A. "No."
Q. "Do you ever have fits or convulsions?"
A. "No."
Q. "Did you ever try to commit suicide?"
A. "No."
Q. "Is anybody trying to harm you in any way?"
A. "Yes, those black-hands anarchists."
Q. "How much money are you worth?"
A. "Nothing."

The foregoing two cases are representative of a group which unquestionably forms the most difficult part in the problem of caring for the insane criminals. Here we have a couple of individuals whose entire psychotic manifestations, if such they may

be considered, consist of a most wild and vicious rebellion against imprisonment. They are individuals who cannot be kept under any prescribed mode of living, and when this is insisted upon, they react to it in an insane manner.

Bonhoeffer justly termed them "wild men," for wild indeed they are when in one of their tantrums. The question arises, "Wherein lies the cause of this rebellion against discipline?" It certainly cannot be wholly attributed to the environment, for these individuals behave in a similar manner even when removed to the far more lenient régime of a hospital. We must seek an explanation for the behavior of these individuals in the individual himself, in his make-up.

Looking at the life history of the two foregoing patients we find them both to be of the most depraved class of society. The one is a professional prostitute; the other subsisting upon the earnings of a prostitute. Their relation with men has always been characterized by a sort of vicious vindictiveness. Their high-strung emotional make-up brought them into serious conflict with those about them on many occasions before. Being finally taken hold of by the law and made to submit to a certain well regulated mode of existence, their inherent characteristics assert themselves in a most decisive way and they react to the situation in the manner of a trapped tiger, stopping at no means to gain their point. The one commits a homicide during one of her outbreaks of passion; the other risks his life to obtain his purpose, by jumping out of a fast-moving train with his hands shackled. Their life seems to be one long series of impulsions, fostered and sustained by the extreme lability of their emotions. Intellectually they show no defect. They are keen and alert to every opportunity which presents itself to them and are very shrewd in the execution of their criminal acts. Finding themselves under a régime which exacts from them a certain submission to rules, to regulations, they begin to misinterpret ordinary occurrences in their environment in a sort of delusional manner: They are persecuted by the warden because the latter insists upon making them behave themselves; the keepers are a bunch of anarchists, whose entire occupation seems to be to persecute them and down them. This for no other reason than because they are made to work and to behave themselves.

J. J. M. tells me that he will not behave himself, that he is not here to please anyone but himself and recognizes no authority other than that of Christ. The other says she raised so much hell down at the prison that they had to send her back to the hospital. The distinguishing feature of their psychotic manifestations is that they are provoked essentially by definite situations. They are not a mere wild, misdirected, meaningless series of insane acts, such as one would expect from a demented person, but distinct reactions to situations. Refuse them a request and they at once become wild, abusive and vicious, smashing up everything that they can lay hands on; conversely, when granted some of their impossible requests, it serves at once to appease them for the time being at least. Their conduct, however, is very detrimental to the prison régime, as discipline cannot be maintained with such disturbing elements about. Their interpretations of discipline are considered as delusions of persecution, their outbursts of temper as typical maniacal outbreaks, and consequently they are shipped off to an insane asylum. Now the question arises whether we are doing out duty by society in declaring these individuals as irresponsible for their acts. In other words, should these individuals with marked and incorrectable criminalistic tendencies be, so to speak, licensed to ignore the law in its entirety by giving them the protection of an insane asylum? Of course, from a broad, humane point of view, we must realize and appreciate that there is something distinctly wrong with these individuals, that their mental endowments are the essential factors which determine their behavior. On the other hand, we must not forget that these individuals fully realize that once they have been sent to an insane asylum, they are protected from punishments by law for all future time and they are ever ready to utilize this knowledge, as has been my experience with quite a number of recidivists, who somehow never get into an insane asylum until they are in the hands of the law. The scope of this paper will not permit me to enter into an extensive discussion on the treatment of these cases. I will say this, however—that we are very far from having solved satisfactorily the question of the care of this particular class of insane criminals. As this paper is not primarily a discussion of the degenerative psychoses, I will refrain from reporting further cases. I believe I have shown by the

preceding two cases that the mental disturbances of the degenerative individuals are essentially psychogenetic in origin.

The foregoing is by no means an exhaustive study of the entire subject of psychogenesis and I do not feel justified in drawing any definite conclusions concerning it. There are, however, certain points which I believe I have established in this paper and these I will here correlate.

First: There exist functional psychoses which do not belong either to the manic-depressive or praecox groups and which develop in consequence of some strong emotional experience.

Second: The development of a psychogenetic disorder does not necessarily presuppose the existence of a degenerative soil; psychogenesis is merely an indication of an individual's make-up, personality.

Third: The symptomatology of the psychogenetic disorders may simulate any of the known psychoses and is fashioned to a marked extent by occurrences in the immediate environment. The occurrence which incited the disorder plays an important rôle in the delusional formation of these individuals.

Fourth: The psychogenetic disorders may be very important from the medico-legal standpoint, as most of the psychoses of criminals are psychogenetic in character.

Fifth: The prognosis in these cases is good. The removal of the patient from the environment which provoked the mental disorder usually serves to put a stop to the process.

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CHEMISTRY OF NERVOUS AND MENTAL DISEASES.*

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I.

The law of psychophysical parallelism postulates that for every mental state we may expect to find some correlated physical concomitant, the former to be looked upon as an effect of the latter. In the search for the cause of mental disease, the attempt to demonstrate the validity of this law may, in part at least, account for the multitudinous works which have sought to find a definite physical change standing in causal relation to psychotic manifestations. In some instances the demonstration is easily made, but in most cases, when we come to search for the genetic relation between the disorder in the cerebral cortex, the necessary precursor of psychic disturbance, and the morbid cause, the connection is found to be quite indirect and extremely complicated. With organic disease, such as brain tumors, and in certain injuries, we find we have to deal with some of the rare conditions wherein mental disturbances may be considered to be the effect of a cause acting directly and exclusively on the brain itself.

Among other etiologic factors in the production of psychic abnormalities, the intoxications, as a class, hold a prominent position. On account of this, with the quite recent advances in the development of nearly all technical and analytical procedures, it is not surprising that a great deal has centered in the hope that the chemist not only would be able to reveal the origin and nature of these intoxications, but might further show exactly in what manner they were related to the disturbed mental functions of which they were presumed to be the cause. More or less arbitrarily, intoxications have been characterized as exogenous or endogenous, according to whether their source was from without

* Lectures given during the Course for the Instruction of Internes, Government Hospital for the Insane, Washington, D. C., 1911.

and external to the organism, or internal, through some abnormality produced within it and, under certain ill-defined conditions, permitted to exert a deleterious action upon the economy. However, it is well to bear in mind that these two great groups of toxic forces do not always exert their influence separately, and it thus often becomes a matter of problematical decision as to the exact point where the action of the poison introduced from without ceases, and a real internal intoxication, set up by chemical disturbances produced by exogenous agents, begins.

For a long time it has been a well recognized fact that many substances introduced into the body are able to produce mental abnormalities. Among such, alcohol probably is first in importance, and all people are more or less familiar with various psychotic states which are associated with the excessive ingestion of this drug. Also, certain other drugs, such as morphine, cocaine, hashish, etc., are capable of producing, in some individuals, disorders in mental function and must be considered as etiologic agents of the exogenous class. Moreover, aside from these psychotic states which openly appear to be in direct relation to the given intoxication, one must also take into consideration all those other conditions in which disease of an organ or organs produces disturbances of certain customary chemical relations and thus indirectly perverts normal metabolic activities. In this class should be included mental anomalies sometimes associated with nephritis and diabetes, along with those commonly found when there is an abnormal variation in the functionating of such glands as produce an internal secretion. From the experiment in which Claude Bernard showed that a lesion in a certain part of the floor of the fourth ventricle would cause glycosuria, we know that the nervous system, in some quite direct manner, may influence certain isolated phases of metabolic activity.

Taking into consideration these facts—that abnormal mental states may be produced by certain recognized exogenous agents, such as alcohol and other drug intoxicants, where the mode of action seems quite direct and apparent; that pathologic conditions in certain organs may lead to the development of psychic disturbances, as the uremia in renal diseases, where the association of cause to effect is less obvious—it was not a great step to make to reach the assumption that other mental disorders, the causation of

which was less evident, might be due to toxic bodies elaborated within the organism as the result of some metabolic disturbance with the exact nature of which we are not yet acquainted. Here, however, we meet with a discussion, the conduction of which has led to the expression of many divergent opinions: Are the psychotic symptoms, manifested in a given instance, the result or the cause of the metabolic disorder? Such answers as we have to this question have too often been given without sufficiently carefully prepared facts to substantiate them. Fact and hypothesis have become so mingled in the same menstruum that it is almost impossible to precipitate the truth in the pure state for further analysis. So it happens that whenever problems concerning the etiology of mental disorders are brought up for consideration, the discussions abound with such vague, indefinite and meaningless expressions as malnutrition, autointoxication, exhaustion, toxins, etc., the only inference from which often seems to be that the user endeavors to postulate some hypothetical disturbance of the metabolic functions, in the attempt to thus elucidate some point in etiology which, in his scheme of causation, is still obviously obscure and wanting explanation. That these are attempts not only associated with the modern age of medicine, the humoral pathology of the ancients bears witness. And it is interesting, though not too encouraging, to note that even to-day, when th bed of the stream seems to be changing, when the hope until recently founded on pathologic anatomy appears to be shifting its basis to the foundations laid by psychopathology, we find the adherents of the latter trend calling for the aid of a "toxin" to supplement their psychogenic etiology of dementia precox, and assuming a "disturbance of sexual metabolism" as an etiologic factor in the psychoneuroses.

Thus it may be seen that long ago those interested in the study of psychiatry have sought to establish some relation, either as cause or effect, between the occurence of metabolic anomalies, using the term in its broadest sense, and mental disorders. Although biologic chemistry, only comparatively recently having reached its present stage of advancement, has succeeded in dissipating some of the clouds upon the horizon, our knowledge of the intricacies of many metabolic processes is still very far from complete. This statement applies particularly to our knowledge of the disorders of metabolism existing in certain diseased conditions, and preëminently

in the insane. The reasons for the existence of these voids in our understanding may be manifold. There are, however, two or three which are definite and tangible. In the first place, many of our current conceptions of the chemical changes occurring within the organism in diseased states, have been derived from clinicians using clinical methods. It is not meant to imply that by such means many valuable facts have not been obtained which, if not final in themselves, have indicated to the laboratory worker further and more detailed, carefully executed, strictly controlled experimentation. Those who are content to follow Bruce (1), who, in his attempt to obtain evidence to support his claim that acute mania is due to an intoxication, used the clinical ureometer of Doremus to show that there are disturbances of metabolism in patients suffering from this disease, will not offer much aid toward the solution of such intricate chemical difficulties as now confront us.

Secondly, although some very painstaking and careful researches involving the metabolism of the insane as a class have been carried out, these are, indeed, relatively few in number as compared with the truly innumerable, inaccurate and incomplete attempts in this field. As late as 1897, when Schaefer (2) collected and reviewed the literature dealing with what might be considered metabolic studies among the insane, he was able to say that none dealt with metabolism as a whole, but considered only isolated features. This state of affairs still obtained when, in 1904, Folin (3) published the results of his several years' study of the chemical processes in insane individuals.

A third reason is that many of those who have attempted to solve these problems, either in part or as a whole, have received inadequate chemical instruction and are lacking in sufficient chemical knowledge and technical experience to attack such intricate problems by methods which, even in the hands of expert biochemists, are possibly not delicate enough or sufficiently advanced to afford a solution of the difficulties.

Although these rather discouraging and perhaps somewhat pessimistic introductory remarks may be calculated to engender in some a tendency to agree with the one who has said that " chemists have wearied of fishing in distilled water for the chemical cause of mental disease," it is possible that the tendency, if it does exist, may be weakened by the hope which one equally great expressed, when

discussing the relation of certain inorganic salts to nervous disorders, that " we may one day discover an inorganic basis for the functional psychoses." There are still many who look toward the newer chemistry for the solution of many of our mooted points, and, although this expectation may be quite ill-founded, it surely cannot be displaced until a vast amount of work, carefully taking into consideration every detail, and using every available means now at our disposal, and discovering others for solving certain problems which are clearly open before us, has amassed a sufficient amount of evidence to prove incontestably the untenability of the position.

The enormous literature which has accumulated testifies to the interest which has been shown in the past in the study of the metabolism of the insane. A critical review of every publication which has appeared does not come within the cofines of this presentation, and it is, moreover, doubtful if thereby any great gain would be made. Possibly, after the somewhat stringent criticisms which have been made of the older studies, it would seem a waste of time to consider them at all, were it not for the fact that by such consideration a conception may be obtained of the work which has been done, the route which the steps of progress have traversed, and the difficulties which have been met with and partially overcome, and in the light of such knowledge one may be better equipped to distinguish the path along which future work is to proceed, and to understand more clearly the references concerning certain disputed points which must inevitably recur now and again during the further exposition of this subject.

Realizing the risk of repetition, it nevertheless seems best to consider a number of apparently rather isolated features relating to the chemistry of nervous and mental diseases which have received a great deal of attention, and then, after this, to make an attempt to correlate with each of the more clearly recognized types of psychoses the more important of the facts which we possess concerning the condition of the metabolic functions in those individuals suffering from such psychoses.

II.

The obviously manifested changes in the physical condition of many patients suffering from some forms of mental and nervous

disorders, early attracted attention toward the changes in body weight. Physicians in attendance upon the insane soon began not only to use the measurement of this outwardly visible variation in the physical state as an indication of the progress of the mental disorder, but also to base their prognoses upon fluctuations observed in the weight curve. Although these coarse attempts to establish a psychophysical parallelism, from the scientific viewpoint of the investigator of metabolic problems, may appear as egregiously fallacious, nevertheless data of some value to the clinician undoubtedly may be obtained in this crude manner. The weight curve here is to be taken only as external evidence of the general state of nutrition as a whole. It cannot by any means offer even the most partial explanation for, or insight into, the intricacies of the complex processes of anabolism and catabolism which are occurring within the tissues of the organism. It is questionable if measurements of body weight alone do more than make possible the mathematical record of changes which can be appreciated only approximately by the unaided eye.

Erlenmeyer (2) and Schulz (2) first called attention to these changes in body weight. They believed that the course of the malady could thereby be recognized. Nasse (2) thought that in the acute, recoverable psychoses, a gain of weight was a favorable sign, but he likewise was aware that transitions from acute to chronic states might be accompanied by similar changes. Fürstner (2) very definitely stated that the weight curve varied directly in proportion to the severity of the cerebral affection, but was not related causally, either directly or always, with the nutritive or motor condition of the patient. Stiff (2), Nasse (2) and others noted an increase of weight during the excited, and a decrease during the depressed, phase of manic depressive psychosis. These changes they considered due to specific stimulation of metabolic processes from the cortex. However, other observers have not confirmed these findings, having determined that a rise or fall in weight may occur irregularly with either state and entirely independently of cerebral action, rather being but an expression of the intensity of the psychosis and the degree of motor activity. The question of the similarity of metabolic processes in the sane and insane has been raised, and, like many others, not definitely settled. It has been conjectured that the increased muscular activity in

excited patients, and, through it, the increased heat production, may account for the marked decreases of weight. That these losses in weight are due not solely to lack of sufficient quantities of nourishment, food and water, is apparently indicated by the observations of Rosenfeld (4) on catatonics. Those catatonics studied by Rosenfeld, though receiving an excess of food through the tube, often, in the early stages of the disease, continued to lose weight rapidly. These same patients, with the beginning of betterment of their mental condition, gained weight on a diet of lower caloric values than that on which they lost at an earlier period. Folin (3) was inclined to think that the remarkable changes in weight observed in the insane might, to a large extent, to due to a dimished or increased elimination of water through the lungs, or through the skin. The determinations of body weight, such as have been mentioned above, have mostly had to do with obviously extreme variations from the normal. They only serve to indicate that such changes are occurring. They fail to aid us in determining the nature of the causes of these changes, much less in establishing any more than hypothetical associations between them and the disorder in the cerebral cortex which manifests itself in the appearance of abnormal psychic activities.

In connection with the consideration of the body weight, a few words might be said here in relation to the energy consumption by individuals suffering from nervous and mental disease. Here we find that the insane do not differ in this respect from the normal, and that this factor depends largely upon the activity of the muscular system (5). It appears obvious, and experiments substantiate the assumption, that decreased muscular activity would decrease the energy consumption. The opposite of this does not, however, hold good without some slight modification. In certain nervous diseases wherein there occurs an increase of muscular activity, as in paralysis agitans (5) and in epilepsy during a seizure, it is true there is an increase for certain periods of the day, or for the time covered by the convulsion. However, the total daily consumption, other things being equal, remains unchanged (5). In states of continued hypermotor activity, however, an increase is noted. As had been mentioned previously, in many cases the heat production thus conditioned, may in part, at least, explain the loss in body weight often observed. A more careful study of the heat-regula-

tory apparatus in the insane might lead to a clearer understanding of some of the unexplained variations in weight which occur. We know, at least, that there does occur some disturbance in heat regulation, either a retention or an over-production in cases of paresis, for how else are we to explain the irregular febrile disturbances which so frequently are observed in those patients who suffer from this disease?

Bornstein (6) believes that in paresis and epilepsy we may have to do with two types of disturbance of temperature. In the former there occurs some disturbance of heat dissipations, *i e.*, a retention, whereas in the latter the rise in temperature is due to an over-production associated with the muscular activity incident to the convulsive seizure. Coleburn (7) believed that the disturbance of heat regulation in paretics was of central origin, and that the degeneration of the vasomotor nerves with their centers in the medulla is probably in a large measure responsible for the loss of power of normal regulation. This observer noted, too, that paretics were much more readily subject to temperature variations than were normal individuals. Although this elevation which he noted could in many instances be explained by excitation in the central nervous system, this in itself was not sufficient, and he concluded that there were other factors involved concerning which our present knowledge is incomplete.

It is a matter of almost daily clinical experience to have our patients complain of subjective sensations of deranged conditions in the stomach and intestines, and yet examination fails to reveal any objective explanation for their occurrence. However, Pawlow has shown that anomalies of secretomotor activity are to a degree influenced by psychic processes. Similar anomalies are found among the insane. Studies of secretory activities of those suffering from the various mental and nervous affections have been limited closely to observing the behavior of the acid constituent of the gastric juice. The results, however, have been widely divergent, and although they may serve to show that variations in the secretion of hydrochloric acid do occur, they absolutely fail to demonstrate that there is any secretory anomaly characteristic of any one form of psychosis.

So far we have considered gastro-intestinal disturbances possibly resulting from a mental condition. Do we have, on the other hand,

mental or nervous disorders which can be said to result from abnormal gastro-intestinal conditions? That such is the case has been claimed, and to disturbances in gastric function have been attributed numerous abnormal mental states (Plönies, 8). The association in time of occurrence of the two is no uncommon observation; however, the same alimentary tract disorder is often seen occurring in widely varying mental conditions. There is yet to be described any one definite pathologic functional variation in the gastro-intestinal system which may be looked upon as the sole cause of an accompanying deviation from the normal in the sphere of mental or nervous activities. Possibly it is from the fact that the vast majority of all our patients show a varying degree of constipation, that it has been argued that we have then, in these instances, to do with an intoxication brought about secondarily as a result of the retention and resorption of numerous intestinal decomposition products, an autointoxication of gastro-intestinal origin. But is not here the primary cause of this accumulation of supposedly deleterious by-products, the constipation, which in itself may be, and probably is, no more than the physical manifestation of the want of central nervous system control of organic functions? Thus we argue in a circle. Further, one might ask, what are these toxic substances? The answer is quite unsatisfactory. Among others, indican has received the greatest share of the blame as being a causative agent in the production of toxemias. Also, other protein cleavage products and organic acids normally produced during digestive processes have received their share of attention. Further than these, speculative hypotheses formulated in the study, and not from laboratory observation, point out the nature of the toxic bodies. In short, so far as gastro-intestinal conditions are concerned, we are not in possession of sufficiently proven data to warrant the assumption that there exists any substance therein produced which in itself can be considered as the causative agent in the origin of mental or nervous disorders. Therefore, as yet, all this group, should they exist in actuality, must continue to be looked upon merely as contributory and concomitant factors.

Through the relatively high content of phosphorus compounds found in nervous tissues (9), it has long been supposed that the study of the variations in the quantity of this element excreted

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Through the relatively high content of phosphorus compounds found in nervous tissues (9), it has long been supposed that the study of the variations in the quantity of this element excreted

would lead to valuable conclusions concerning metabolic changes occurring within the central nervous system in states of health and disease. The ancient conception that phosphorus was the *sine qua non* of mental function has no doubt played an important rôle and exerted a very definite influence upon the direction of approach adopted by many investigators interested in the chemical expression of brain activities. The older works tended to show that there was a direct relation of not only a qualitative but also a quantitative nature existing between the phosphorus metabolized and mental and nervous activity. In the light of our present knowledge of the difficulties met with in determining the exact nature of the numerous interrelated influences which must be considered in studying the question of phosphorus metabolism, it is easily seen that conclusions drawn from work not giving due weight to these various influences must needs be erroneous. It may be said now, so far as there exists any evidence to the contrary, that there is no quantitative relation existing between the degree of nerve or brain activity and the amount of phosphorus metabolized. However, since Feder (10) conclusively proved the untenability of this popular belief, many works have appeared endeavoring to point out such a relation. Feder's argument was simple. According to his figures it would require that one-fourth of the entire brain must at times be disintegrated in less than two hours if one was to explain by the activity of nerve metabolism the varying nitrogen-phosphorus ratios for different parts of the same day. More recently some analyses of brain tissues by Koch (9) have shown how little the phosphorus content is changed from the normal even in such diseases of the brain as general paralysis, where we have at times an enormous destruction of cerebral tissue.

An idea which one frequently sees expressed in the older textbooks on clinical diagnosis is that there is a disturbance of the ratio of earthy to alkaline phosphates in certain disordered mental states, that during mental activity the alkaline phosphates were absorbed and the earthy excreted, so that in the urine, during such mentally active periods, the first would be low and the latter high. Mairet (2) also stated that in mania alkaline and earthy phosphates were increased, whereas in melancholia the phosphates alone were increased with a retention of the earthy phosphates. Such views are interesting only in that they show the extreme attempts which

have been made to correlate changes in phosphorus elimination with mental states.

It is true that, at times, variations of the nitrogen-phosphorus ratio are observed, but there are many other factors aside from brain activity which may as easily explain these—such as changed resorptive conditions in the gastro-intestinal tract and the degree of muscular exertion. In connection with changes in the gastro-intestinal tract should be mentioned the phosphaturia which is so frequently attributed to abnormal variations in the mental condition. Peyer (2) spoke of this condition as a renal neurosis. He thought that this "secretion neurosis," as he termed it, arose reflexly through the effect of renal nerves acting upon special glandular cells, and that at the bottom of all would generally be found some sexual anomaly, hysteria or neurasthenia. However, this condition depends partly upon disturbances in the secretion of hydrochloric acid in the stomach and partly upon certain resorptive changes in the intestines, whereby the excretion of calcium and magnesium in the urine is disturbed. The changed secretion of phosphates is related closely with the degree of acidity of the urine (11). Possibly here one may be permitted to think that psychic processes indirectly exert some influence on this, as Pawlow has shown that such processes may influence quantitatively the degree of acidity of the gastric juice. Yet at the present time we are not in possession of a sufficient quantity of exact observations relative to the secretions of the intestinal glands which for an adequate solution of this problem is necessary. Folin (12) advanced, as a working hypothesis, the idea that in certain nervous states the system (nerve tissues) for some reason is unable to assimilate (organize) a part of the phosphorus absorbed from the digestive tract, and that this is eliminated, thus increasing the total output.

In studying the effect of loss of sleep in normal individuals, Sherman (13) showed that a marked loss could slightly increase the phosphorus output. These increments of increase were not much greater than the usually observed daily variations. Benedict and Carpenter (14), after a long series of careful experiments in which they sought to determine the effect of mental work upon metabolism, were of the opinion that the results obtained did not indicate that mental effort had a positive influence on metabolic activity.

From the foregoing statements the conclusion seems to be warranted that the central nervous system, either in states of disease or in health, exerts no direct influence upon the metabolism of phosphorus.

III.

The many products of chemical activity within the tissues which are eliminated from the body through the agency of the renal cells have received a vast amount of attention in connection with studies in metabolism. Although, as has already been pointed out, few clinical methods of examination will suffice to carry on exact chemical studies, it is preëminently fitting at this place to remark that the major portion of the studies of the urine have been made by clinicians using methods devised for clinical purposes. The conditions of the experiments have been generally unsuitable, the conduction of the work usually unscientific, and the conclusions drawn from the results thus obtained often necessarily inaccurate. And yet, provided these sources of error are arranged in one's mind, as it were, parallel with the results themselves, knowledge of some value may be derived from their consideration.

These observations have to do largely with the occurrence in the urine of bodies which are normally absent or, at least, present in such small quantities or traces as to be considered negligible. In other words, the observations are, to a degree, more qualitative than quantitative. Among those pathologic constituents of the urine which have received especial attention, various protein bodies, particularly the albumins, stand in the first place. A transient albuminuria occurs during the course of many mental and nervous diseases, and may be either accidental or renal in nature. In a great many psychoses, repeated examinations will occasionally show a transitory albuminuria. This finding is not in any way constant, nor even characteristic of the psychoses as a class, nor of any one psychosis in particular. It is a common observation that in delirium tremens, and in deliria of other causation, albumin is frequently found in the urine in quantity varying from a trace to a large amount. In the delirium associated with alcoholism, this albuminuria is found to vary almost directly with the degree of excitement. (In such cases, subsequently, the autopsy often shows a normal kidney.) Some studies have indicated that the total fre-

quency of the occurrence of albumin or casts is not great and no definite or regular rule of variation in their appearance can be formulated (15). Aside from all other controlling factors, they are more often found by examinations made within the early days of the patient's residence in the hospital. Possibly within a few days, or a week, after the initial examination is made, these abnormal elements may have entirely disappeared. In some instances, their disappearance accompanies some slight betterment in the patient's mental condition. As a rule, however, not even an approximately constant correlation between the patient's condition and their presence or absence can be determined. The changed condition from the home surroundings to the routine of hospital régime, with its attendant increased rest, attention and transition of dietary measures, probably will help greatly in explaning this change in the renal excretion. Köppen (4) likewise concluded that this transitory albuminuria so aften noted could, in most cases, be explained by other factors than specific influence of the central nervous system, or changes in it during mental disorder. From all data at hand it seems absolutely unwarranted to conclude that albuminuria is any more common among the insane, as a class, than it is in otherwise healthly persons. Rather is its occurrence to be explained in any other way than by the interaction of psychic factors.

To uric acid has been assigned the causation of nearly every ailment to which the human system is subject. Since Haig's work in 1888 those interested in psychiatry have not been slow to seize upon uric acid, or certain chemical bodies nearly related to it, as substances of paramount etiologic importance in the causation of mental disorders. Here, too, as in many other instances, some have been backward in giving up ideas which have been shown to be poorly founded. Possibly the principal source of the error in the conclusions drawn from the quantitative changes in the excretion of uric acid has been in the failure to recognize the relative importance of the exogenous and endogenous uric acid fractions. For this reason in most experiments the quantity of nuclein bodies ingested with the diet have not been calculated. As the most definite relations existing between uric acid and mental or nervous disorders have been developed in connection with studies upon epilepsy, they will not be set forth until that disease is considered.

Regarding the psychoses as a whole, Folin (3) found that the uric acid component of the total urinary nitrogen, which under given conditions, in normal individuals, varies within relatively narrow limits, showed marked fluctuations in those persons suffering from mental and nervous diseases. He was, however, unable to find any point characteristic of a particular psychosis.

An opinion which seems to have gained considerable currency is that disorders of carbohydrate metabolism are frequently noted in those individuals who suffer from diseases of the central nervous system. This may be true for certain disturbances, organic in nature. However, for the functional psychoses the statement does not equally hold good. According to Mohr (5), glycosuria is found by far the most commonly in cases of traumatic diseases of the brain, and in the traumatic neuroses. Next to these come the focal diseases of the brain, and in the last place stand diseases of the spinal cord and the functional neuroses. Traumatic glycosuria may be produced, as in the experiment of Claude Bernard, by stimulation of certain of the cervical and thoracic ganglia, by section of the cord at the medulla, etc. Vascular disease (apoplexy) or tumors may also produce a transient glycosuria. However, aside from the lesion in the fourth ventricle, in man it seems to make but little difference where in the brain the lesion is situated. There are cases reported in sufficient number where the dependence of the glycosuria upon the brain disorder appears clear, yet no symptoms of focal disease are recognizable clinically and none are found at autopsy. The value, then, of glycosuria as a sign of focal lesion in the central nervous system is not great. Moreover, the great majority of observations tend to show that glycosuria is not connected directly with any one type or group of psychoses. It has been noted to accompany states of excitement or depression, in association with puerperal psychoses, with epilepsy, paresis, tabes and manic depressive insanity in both excited and depressed phases (17).*

* In a series of over eight hundred observations made on the urine of two hundred and forty patients, including individuals suffering from practically all varieties of functional and organic psychoses, a reducing substance was found in the urine of only two (15). The first was an individual suffering from true paranoia associated with diabetes mellitus of years' standing. The second was that of a young man suffering from

Comparatively recently Schultz and Knauer (17) have carried on some extensive observations concerning the metabolism of carbohydrates in various forms of mental disease. Their most common observation was that a glycosuria, often transient in character, accompanied depressed and *angst* states. In those patients where the glycosuria was more persistent, there appeared a diminution of the sugar excretion coincidently with betterment in the mental conditions. They further indicate that it is indifferent whether the depression is primary or secondary in nature, or to what disease type it belongs. Glycosuria was observed not only in the depressed phase of manic depressive insanity, and in melancholia, but also in the depressions associated with imbecility, dementia precox and paresis. Thus they agree that the glycosuria is only of symptomatic value and cannot be considered as characteristic of any one psychosis. The highest frequency of occurrence of glycosuria was noted in organic disease involving the medulla (86%), and far lower in all otherwise located organic nervous diseases (3%). Schultz and Knauer were of the opinion that the glycosuria observed by them was not the cause, but the result, of the mental state, *i. e.*, was of neurogenic origin. Glycosuria seems to be a very common occurrence in delirium tremens, Arndt (18) finding it present in 30% of his cases.

From the importance which has been and still is attributed to the supposed variations in the amount of indican occurring in the urine of those suffering from mental disease, it becomes advisable to dwell somewhat upon the consideration of this substance and its possible relation to mental disorders. In the process of digestion, from the cleavage of protein substances, there separates a definite chemical product of known structural formula, indol, which after oxidation is known as indoxyl. This latter substance after conjugation with sulphuric acid is excreted in the urine as one of

a psychoneurosis. The body only partially reduced Fehling's solution, and its nature was not discovered, as the succeeding twenty-four hour specimen possessed no reducing action and subsequent examinations failed to reveal its presence. It was thought that in this instance the reduction was due to drugs which had been administered to produce sleep during the preceding night. These observations were made with all due precautions on twenty-four hour specimens of urine from patients where the diet and condition during the period covered by the collection of the urine were noted in each instance.

the ethereal sulphates—indoxyl sulphuric acid or urinary indican. Putrefactive processes in the small intestine give rise to the occurrence of the precursors of indican. Hence an increase in putrefactive activity will occasion an increase of indican, other things being equal. Under almost any condition, indican continues to be excreted with the urine. Thus in starvation its source is from the decomposition products of the protein portion of the secretion of the intestinal epithelium. Among psychic disorders it is principally among the depressions of varied types that the indican has been supposed to have shown important variation in quantity. In this connection it is pertinent to recall that the process which favors the production of indican, putrefaction, is in itself given more opportunity to become active by the degree of constipation which is such a frequent accompaniment of states of depression. However, that the constipation is not the sole cause is apparently shown by the observation of Seige (19), who, in his study of a case of manic depressive psychosis, saw an increased indicanuria associated with every recurring depressed phase even when there occurred a coincident diarrhea. On this account the elimination of the indican in the urine is by some thought to be controlled by the central nervous system. Therefore, these speak of an indicanuria of central origin. There is not as yet any sufficiently satisfactory proof of this conception, and the question must be left unsettled. A great many of the observations upon the indican excretion have been made without sufficient control of the character of the food ingested by the subject of the experiment. It is to be seen easily that, given those conditions, mental depression and obstipation, under which putrefaction is favored, the excretion of indican depends largely upon the amount of protein bodies present in the intestinal tract. There are, however, certain qualifications which prevent the existence of a direct ratio between these two factors. To illustrate the effect of the nature of the food consumed upon the amount of indican excreted, I will refer to a metabolism study which I made some time ago (20). The patient, a well-nourished man, was subject to repeated attacks, beginning with a very mild and transient excitement passing over into a varying degree of stupor, lasting for some days. During the period when this observation was made, for the first week, he refused all nourishment. Coincidently the indican rapidly disappeared from the urine. In the next week on

a diet rich in nitrogen, indicanuria became very marked. Following this on a nitrogen poor diet, the quantity of indican excreted decreased, only to increase again on the nitrogen rich diet. No regular association of the degree of constipation and excretion of indican could be determined. Likewise, the changes in the amount of indican eliminated were not directly related to the mental condition, and, in this instance at least, the excretion seemed to be principally dependent upon the character of the diet. I do not believe that we can conclude in view of our present knowledge that the indican of the urine has any especial significance in relation to mental or nervous diseases.

IV.

Although possibly a consideration of the blood and cerebrospinal fluid does not exactly come within the limits of a discussion of the chemistry of nervous and mental diseases, some mention of the findings in these two fluids may not be out of place entirely at this point.

Studies carried out with the blood fall naturally into three groups: histological, chemical and physical. Our conclusions must needs be drawn from many separate sources, for not one deals with all the various questions which have been brought up regarding the blood of the insane as a class.

Diseases of the nervous system may stand in very close relation to those of the blood, because it is possible that the same agencies which act deleteriously upon the blood may also exert an unfavorable influence upon the nervous system. Probably the best example of the association of the two is to be found in the cord changes seen in some cases of pernicious anemia. Whether in this instance the effect of the blood disease is exerted directly upon the nerve cells of the spinal cord, or whether the nerve element injury is resultant upon secondary capillary hemorrhages, is not to be decided with certainty. Yet it does seem quite probable that blood diseases and nervous disorders sometimes originate upon a common basis. Possibly the most obvious changes in the circulatory system during mental disorder are to be noted in the disturbances of the vasomotor system, causing changes in the normal distribution of blood to certain parts. The cyanosis of the extremities in dementia precox will serve to illustrate this remark.

In the various paralyses we have a somewhat clearer conception of the manner of operation of the causes producing the change in blood supply to the affected part. To these vasomotor disturbances have been attributed the somewhat abnormal findings regarding the formed elements and hemoglobin content of the blood in hysterics and neurasthenics. Here, as in most psychoses, a mild grade of anemia is generally to be found (Jacobi, 21; Mitchell, 22).

Concerning the histological elements of the blood as a whole, as found in the insane, there seems to be a great disagreement of opinions. Nearly all observers agree that there exists a varying grade of anemia of the secondary type (Hittorf, 23; Lindsay, 24; MacPhail, 25; Winckler, 26), this largely dependent upon the mode of life of the insane. Melvin (27) showed that this was more pronounced in those patients living indoors, less so in those living in tents, and practically absent in those who were employed in out of door labor. Also, Melvin noted that a low red blood cell count becomes gradually more pronounced with the continuance of residence in a hospital. Many observers have seemed to find an increase in the red blood cells in paresis (Bodington, 28; Klippel and Lefas, 29; Jelliffe, 30). More careful work indicates that this is true only in the later stages and especially in fairly close association in time with convulsive seizures (31). In most excited states, the report most frequently met with is an increase in the number of erythrocytes. The cause for this is thought to be found in the muscular exertion associated with the mental exaltation, and the absence of motor activity in depressed states has likewise been thought to be sufficient explanation for the lowering below normal limits of the number of red cells per cubic millimeter (32). However, muscular activity alone is not adequate to explain these variations, as the cell count does not parallel in some instances the degree of motor activity (33). Without further mention, this phase of the subject may be dismissed with the statement that we have no reason to believe that any definite variation in the red blood cells, either in number or form, has been found to be characteristic of a particular psychosis.

With the leucocytes there may be some cause for believing that we have certain variations associated with a given type of mental disturbance. Yet we cannot from this assume that these variations

are to be correlated directly either as cause or effect, with the mental disorer, *per se*. Rather are both to be looked upon as evidence of one and the same basal disorder of as yet unknown and indefinite nature. Or perhaps the blood changes are to be considered as secondary to the general condition of health associated with the mental disorder or directly dependent upon extrinsic or accidental causation which in itself has no immediate relation with the mental disease. In delirium tremens we have a mental disturbance of toxic origin wherein the behavior of the leucocytes seems to be fairly closely related to the phase of the disease. During the delirium the total number of white blood cells is increased but sinks rapidly after the "crisis sleep." This total increase is not extensive, but is definite. This is not wholly due to the accompanying temperature changes, and experiments (34) have shown that pyrexia in itself is not sufficient to cause a leucocytosis. During the delirium the percentage numbers of the leucocytes vary in a definite manner—the polymorphonuclears are high, and the mononuclears low. The most definite and possibly characteristic relative change is seen in the eosinophile cells. These during the delirium are much decreased or entirely absent. Elzholz (35) who made a careful study of the blood in delirium tremens, considered the blood findings as characteristic of the disorder. In paresis there is found an increase in the white blood cells, especially at the time of the seizure (31). Further, it has been shown (36) that this increase, as also that found in certain other mental disorders associated with convulsive seizures, is due to two factors. One, a physiologic, is associated with the increased muscular activity, and the second, a pathologic form, is dependent upon some concomitant inflammatory reaction. There have been reported (28) variations in the number of leucocytes in paretics in relation to the stage of the disease, being somewhat uniformly increased in the second stage, and decreasing in the third. In addition to these there are further variations associated with the seizures. In tabes a few observations have shown a relatively high number of eosinophilic cells (Klippel and Lefas, 37; Sabrazes and Mathis, 38). In epilepsy the blood findings have been absolutely discordant, and no uniformity can be reached in the conclusions. Many observers report no change, whereas others (39) have noted changes, generally an increase in the number of white blood cells. Particularly

in association with the seizure have these changes been noted and no doubt we may have to do here with a leucocytosis largely dependent upon muscular activity. During the intervals between attacks, an eosinophilia has been noted and observers (40) have gone so far as to claim that this indicated the presence of a toxin. The number of these cells were taken to measure the concentration of this toxin and by the necrobiosis they judged the potency of this toxin. A leucocytosis may proceed or follow the epileptic seizure or we may have a leucocytosis unaccompanied by a seizure, thus showing that they are not always dependent upon each other (41). Berkley (42) is of the opinion that there is a characteristic blood picture of dementia precox, particularly is this shown in the changes in the relative number of the mononuclear forms, *i. e.*, an increase of these with a compensating decrease of the polymorphonuclears. He also believes that information of prognostic value may be obtained from the blood examination—the outlook being more favorable with a relatively high percentage of the smaller mononuclear elements. An eosinophilia in dementia precox has been observed (Purdum and Wells, 43; Lepine and Popoff. 44).

Of the hemoglobin content and the platelets little need be said. In general the amount of hemoglobin parallels the number of erythrocytes and variations in the direction of a decrease are generally observed under similar conditions as those wherein we find a decrease in the red blood cells, *i. e.*, a secondary anemia. Very little work has been done with the study of the blood platelets in the blood of the insane. Possibly they are increased in the manic phase of manic depressive insanity, and also in excitements occurring during the course of other mental disorders (45).

The chemical studies have dealt largely with the search for abnormal substances or the pathologic increase or decrease of some of its normal constituents, and have also taken into consideration the degree of alkalinity. Various abnormal and supposedly toxic substances have been reported as existing in the blood of individuals suffering from various mental and nervous disturbances. Among these we may mention an increased amount of fibrin in paresis; substances increasing or decreasing the coagulation time (Besta, 46; Tommasi, 47; Turner, 48); lactic acid in the serum in a case of myasthenic paralysis; ammonium carbamate in the blood of epileptics, etc. Krainski (49) believed that epileptic seizures were

due to an accumulation of ammonium carbamate in the blood, and he advanced this finding to support his contention that this was the toxic agent of causal effect in epilepsy. Most, if not all, of these findings have received little confirmation, and, together with the work of certain Italian observers regarding hematologic toxins, must be accepted as of doubtful value and with the greatest reservations.

Regarding physico-chemic studies, there is little of definite value that has been learned. Changes in specific gravity and tonicity (Agostini, 50; Tirelli, 51; Zilocchi, 52) have been noted to occur, and at first have been heralded as of the greatest diagnostic portent. However, multitudinous factors are capable of modifying these observations before it is necessary to assume that the variations are related in any way to a given mental disorder. The more recent acquisition of knowledge concerning the laws governing the behavior of the red blood cells in different solutions tends to show that little reliance is to be placed upon the deductions formerly drawn from experiments upon the tonicity of the blood serum in mental diseases. Determinations of the alkalinity of the blood (Lambranzi, 53; Pugh, 54; Schultz, 55) have likewise offered no constant results which may be correlated with any particular type of mental disorder.

When the mode of the origin of spinal fluid is recalled, it is natural to suppose that in this there might be found substances which result from diseased conditions in the central nervous system. Especially in those diseases of the brain and cord where there are anatomically demonstrable gross destructive lesions, might it be expected that substances produced by such pathologic processes would find their way into the cerebrospinal lymph. Observation has shown that to a degree such is the case. Since the introduction of the examination of the spinal fluid obtained by lumbar puncture as a diagnostic measure in diseases dependent upon syphilitic infection, our knowledge of the chemistry of the spinal fluid has been greatly augmented. Firstly, there was found the pleocytosis and increased protein content which accompanied certain diseased states. With the advent of the Wassermann test the work assumed a different trend. The attempt to discover some factor which could explain the mechanism of this reaction led to the study of more complex biochemic problems and directed atten-

tion to hitherto little studied chemical substances. Among these was lecithin. The widespread occurrence of this phospholipoid throughout all cellular structures emphasized its possible importance in physiologic processes, and the relatively great amount of it found in nervous tissue indicated that it enjoyed some especial rôle in connection with the functions of the central nervous system. Its presence in the envelopes of the red blood cells assumes for it a particular value in all hemolytic studies.* That lecithin exerts some influence upon the metabolism in general is apparently shown by the experiments of Yoshimoto (56) wherein it was found that in certain lecithin feeding experiments, there occurred a retention of nitrogen and sulphur by the organism. In reference to its relation to diseases of the nervous system, several studies have been made. Most of these have dealt with the metaluetic disorders and further mention of the results will be reserved until these diseases are considered.

In connection with lecithin, a few words may be said of cholin. The relation of cholin to lecithin makes this consideration of some interest. In the structural formula of lecithin it is seen that the nitrogenous base cholin is substituted for one of the phosphoric acid hydrogens, and thus with the breaking up of lecithin cholin is liberated. Halliburton (60) first reported the finding of cholin in the cerebrospinal fluid in paresis and epilepsy. Donath (61) in part confirmed the work and considered the substance as very important in the production of epileptic seizures. The work of Handelsman (62) showed that the conclusions had been based on results obtained by unreliable methods and he could not confirm them. Kinoshita (63) has recently demonstrated that cholin is found in many body tissues and organs normally and cannot be looked upon as a truly pathologic substance. Its toxicologic properties have probably been greatly overestimated. Gautrelet (64) has pointed out that it exerts a depressant action upon the blood pressure, thus antagonizing the effect of the chromaffine (adrenal)

* Although Overton's conception of the constituents of the cell membrane is not entirely a proven and accepted fact, it seems best to use it here as the principally current opinion. Also, in view of the degree of confusion existing at present concerning the exact chemistry of the lipoids, the term lecithin is not quite specific, but includes a number of similar bodies which are only recently being recognized.

system. [It is interesting here to note that the adrenal contains (12%), next to the brain (27%), the greatest quantity of lecithin (Koch, 65).]

A lesser degree of importance has been ascribed to cholesterin. Pighini (66) has pointed out several interesting features concerning its occurrence in the spinal fluid of persons suffering from mental disorders. His studies were made on normal individuals, alcoholics, and those suffering from paresis, dementia precox, manic depressive insanity, epilepsy, and apoplectic dementia. Cholesterin was found in the fluid of those suffering from dementia precox, paresis and epilepsy only. As Pighini points out it is possible that if more cases of the other disorders were studied, it might also be found more frequently. Yet his work is sufficient to show the comparative frequency of its occurrence in the spinal fluid of the diseases mentioned. In paresis it was found in 88% of the cases; in epilepsy in 66%; and in dementia procox 42.8%. It is worthy to note, too, that the cholesterin is more frequently observed and in greater quantities at the time when the disease is the most active; for instance, in paresis, when the clinical observation indicates the greatest degree of progress, in epilepsy when the seizures are occurring with greater frequency and severity, and in dementia precox during the earlier manifestations of the disorder, *i. e.*, in the first year. What the significance of cholesterin may be is uncertain. It might be mentioned that Pighini considers that the Wassermann reaction depends upon its presence.

Other elements which have received attention in the spinal fluid are sodium chloride, phosphoric acid and total nitrogen. Little information of definite character has been obtained. In diseases of the nervous system (tabes, tabo-paresis, cerebral lues, cerebral hemorrhages and tubercular meningitis), other than for a possibly slight increase in total nitrogen in tubercular meningitis, nothing characteristic has been found (Landau and Halpern, 67). The phosphoric acid content of the cerebrospinal fluid has been determined in cases of delirium tremens, cerebral and congenital lues, cerebral tumor, tubercular meningitis, uremia, idiopathic epilepsy, tabes and paresis (Apelt and Schumm, 68). These observers were unable to agree with Donath on the high content in paresis. Although they admit that there seems to be some slight increase in paresis, yet they believe that similar variations are as frequently

met with in normal fluids. The quantitative demonstration of the phosphoric acid content of the fluid in the conditions studied by them led Apelt and Schumm to conclude that the results varied so little in the different diseases that nothing of diagnostic value was offered. It is interesting to note that twenty-four hours after death the phosphoric acid is increased from three to ten fold (Apelt and Schumm) and this may explain some results where this source of error was not taken into consideration.

V.

The nature of the relation existing between the internal secretion of certain glandular structures and the activites of the central nervous system has given rise to much study and considerable speculation. In the past it has been the custom to attribute various anomalies of functions of the nerve tissue to changes in certain of these glands. It is particularly true that this relationship has been indicated in instances where there is some disturbance of the thyroid gland. Although within the last few years much information has been obtained concerning the part played by the ductless glands as a class, it is still too evident that our knowledge of their influence upon mental and physical activities in general is far from complete. It is quite probable that no one of these glands exerts its influence singly. Rather do we find there are fairly good reasons for supposing that the active principle of one either complements or antagonizes that of the other. The more recent work in this field has been collected by Bauer (82), and from his paper it is most evident that we have to do with a problem of extremely intricate and complex character. Where previously, whenever a disturbance in one of these glands was correlated with nervous anomalies, one spoke vaguely of some nervous control, it is now more the opinion that the effect is produced owing to some disturbance of chemical processes within the gland in question.

Of this group of organs the thyroid system has received the greatest amount of attention and, at least, is so far as we know, is most closely associated with mental anomalies. Certain conditions associated with thyreogenic disturbances are in many instances not dissimilar to those existing in some mental diseases where thyroid disorder is not apparent. Thus we know that under

conditions where there exists a thyroid hypofunction, there are found occasionally physical and, to a lesser degree, mental concomitants which outwardly bear some resemblance to dementia precox—the myxedema with lethargy, indifference and stupidity. It is the consensus of opinion that in cases of thyroid hypofunction there is to be observed a marked decrease in the metabolic activity of the organism in general. As will be pointed out more fully subsequently, there have been made some observations which tend to indicate that in dementia precox there occurs a diminution quantitatively in metabolic activities. What relations may exist between these analogies cannot as yet be stated. A great deal of uncertainty and confusion of results has undoubtedly arisen because the importance of the parathyroid bodies was not recognized until within the past few years. Previously the effects of thyroidectomy had frequently been complicated by the coincident removal of the parathyroids. In instances where by chance the parathyroid bodies had not been removed, the effects of excision of a portion of the thyroid were entirely different. With the greater information concerning the results of parathyroidectomy possible analogies have been seen existing between tetany, epilepsy, and certain motor disturbances in catatonia. The relation existing between certain forms of tetany and disturbed parathyroid function has been shown by MacCallum and Voegtlin (85), who clearly demonstrated the rôle of calcium salts in this condition. The importance of the calcium ion in the normal contractility of muscular tissue has been emphasized by Loeb. This relationship assumes a somewhat more definite importance from the view-point of mental medicine, since is has been shown (Bornstein and Stroman, 83) that in epilepsy changes in the calcium metabolism may occur. Further, the giving of calcium salts exerts a marked therapeutic effect upon the tetany associated with parathyroidectomy. Similarly beneficial results have not been observed in the treatment of epilepsy.

While our conclusions concerning the influence of the thyroid system must be as yet of a speculative character, this is more especially true when we take into consideration our knowledge of the relations which may exist between the function of the nervous system and other glands of this class—the adrenals, pituitary body, etc. Study so far has done little more than offer hints of their possible importance.

Interesting facts have been brought to light, but as yet the interrelating details have not been sufficiently clearly recognized to permit of any degree of satisfactory correlation of data at hand. General medicine is only in the beginning of an appreciation of the undoubted pathologic potential which these glandular structures possess through the agency of their internal secretions. The relation which they bear to mental disease is practically unknown, and with this scant mention we will leave the subject.

VI.

DEMENTIA PRECOX.

Perhaps in the present day the tendency in some quarters to make a diagnosis of dementia precox in so large a number of cases in which symptoms of mental derangement have developed during the period of adolescence, has led to the consideration in the first instance of the metabolic processes occurring in these individuals. Our knowledge of these processes, however, has not developed in proportion to the apparent frequency in the occurrence of the disease itself. Dementia precox not infrequently has been looked upon as an example of a mental disturbance associated with which there are metabolic disorders. The reasons for this assumption are not, so far as can be determined at least, dependent so much upon careful and adequate laboratory studies as upon general clinical observation and deduction. The not uncommonly observed increase in weight often paralleling the progressive mental deterioration offers gross evidence of the existence of some metabolic change. Whether or not such changes are in any degree directly associated, either as cause or result, with the changed mental state, is far less certain and still remains an open question. As has previously been pointed out, the older writers were not unfamilar with these outward unfavorable prognostic features coupled with gain in weight occurring in those suffering from a mental disorder of chronic nature. Analogies were drawn between this condition and that existing in cretinism, a disturbance in which there undoubtedly do exist metabolic anomalies. More recently we have seen this analogy drawn upon strongly, and it has been claimed that dementia precox itself, and particularly the catatonic variety of this disease, depends upon disorders of function of the thyroid

gland (42). The proof of this claim is as yet quite insufficient and more evidence must be accumulated before it may be accepted. Rosenfeld's (4) observations on catatonics indicate that there is some inability on the part of the body to utilize the ingested food in the normal manner, so that in spite of an enormously increased intake (forced by tube feeding) there would occur during the acute phases of the disease an extensive drop in the weight curve. During the period of convalescence, moreover, on the same diet, the weight would rapidly increase.

Folin's (3) work, to which we must frequently refer, as it is the most extensive chemical study yet made of the metabolism of the insane, was unable to demonstrate any noteworthy variation of metabolic processes in those suffering from dementia precox. It is true that, in looking over the tables portraying the metabolism in these cases, one does find many variations in this or that substance, but no regularity or constancy in this variation can possibly be discovered. This irregularity, which as Folin himself has indicated, is more noticeable than is to be considered normal, betrays some generalized metabolic anomaly—the exact nature of which still remains to be demonstrated. Others working along similar lines have only substantiated Folin's conclusions.

Bornstein (6) showed that in hebephrenia there was a quite apparent and fairly constant diminution in the oxidative processes which could not be accounted for solely by the age of the individual. In relation to Bornstein's work there is to be mentioned similar conclusions which have been derived from entirely dissimilar methods of approach. Koch (69) has shown that in the brain of the precox there is a variation in the neutral sulphur portion which so far as is known is not observed in the normal brain or that of those who suffer from some psychosis other than dementia precox. Although there may be some uncertainty as to the full meaning of this sulphur fraction, it is conceded that it represents a less highly oxidized type. Further, this neutral sulphur has been found (not regularly) increased in amount in the urine in cases of dementia precox (Pighini 70). So far we are in possession of these facts, their full meaning is yet to be discovered.

To summarize—it may be said that in dementia precox there is evidence sufficient to indicate the existence of some abnormal variation in metabolism, but that with our present knowledge we

are unable to define either its relation to the mental disease, or the extent of its activity.

MANIC DEPRESSIVE INSANITY.

Here we meet with a difficulty to some extent already encountered in our considerations of dementia precox, namely, the uncertainty of the diagnosis. On this account, too, some of the older literature must be discarded almost entirely. As is true in other mental disorders, where there are marked variations in the symptomatology in the same individual, so in the manic depressive psychosis the cyclic affect changes have attracted considerable attention in the search for some correlated disturbance in chemical processes. In the first instance, we have, in support of the view that there do exist metabolic anomalies associated with this disease, the not infrequent gross changes in the functions of certain groups of organs. A frequent accompaniment of depressed states is constipation, whether or not it is causal or secondary is not so clearly recognized. The train of symptoms resulting from constipation in a mentally normal individual are known—the general feeling of depression and ill-being. An intoxication of gastro-intestinal origin is quite naturally proffered as an explanation of the origin of these symptoms under such conditions. So much the more so did it appear reasonable to conclude that there is a similar causation for those abnormal mental states in which the depression had assumed quite definitely pathologic proportions. In the search for the substance which has been productive of these toxemias, indican has come to occupy a position of choice. This substance, as has been mentioned, was once supposed to originate solely as a result of the putrefactive cleavage of the protein molecule in the intestinal tract. In this light it came to be looked upon as an indicator of the extent of such putrefactive processes. This idea the majority of physiologists still hold. However, it has been shown (71) that the production of indol in the intestines and the excretion of indican in the urine do not necessarily or always run parallel. Variations in the amount of indican excreted have led to the assumption that this was the substance to which the toxic agency was to be attributed. Taubert (72) reported the case of a patient suffering from manic depressive psychosis where, with the varying affect changes, there were observed corresponding differences in

the amount of indican excreted. The appearance of indicanuria often preceded by two days the appearance of the manic phase symptomatology, and Taubert found this so regular in occurrence that he believed he could accurately predict by it the approach of a period of excitement. The increase in the indoxyl-sulphate in the urine was *absent during the depressed phases.* Taubert notes that intestinal antiseptics (?) and a low nitrogen diet had no effect on the amounts excreted. He concludes that this indicanuria is of central or neurogenic origin and, further, that it and the excitement find a common basis in the unknown cause of manic depressive insanity. The case studied by Seige (73) is of interest here. In his patient (manic depressive psychosis) rapidly alternating phases of excitement and depression occurred, *and associated with each depressed phase there was found a marked increase in the amount of indican excreted.* Constipation was not present. Seige with Taubert concluded that he had to do with an indicanuria of central origin, *i. e.,* neurogenic. From these two observations it is apparent that there may be an indicanuria *associated* with certain changes in the mental state. There is not sufficient reason to accept the neurogenic conception of its causation. We may speculate as to why it occurred in one case always and only associated with the excited period and in the other equally exclusively with the depressed phase. No adequate explanation is at hand. There are several cogent reasons why indican or indol cannot be accepted as toxic agents instrumental in the production of manic depressive insanity or as substances especially related to this disease in any other way. In the first place indican possesses practically no toxic action and indol but very slight. Secondly, it is not only in manic depressive insanity that these changes have been noted. Indicanuria has also been frequently observed in epilepsy, paresis and other types of mental disorder (Kauffmann, 74, 75; Folin, 3). In a number of cases Folin's tables show no variation in the amount excreted which occurred with any degree of regularity in association with changes in the mental states, nor was the quantity excreted abnormal in comparison with that excreted by mentally normal individuals on the same diet.

Another not infrequent observation tending to indicate some disturbance of metabolism is the fluctuation in the weight curve which occurs in patients suffering from manic depressive insanity.

Your attention has been called to the changes in the general consideration of variations in body weight noted in the psychoses as a class. It is only necessary to repeat here that these changes do occur and that more recent work has tended to confirm these findings without contributing anything additional to our understanding of their relation to the mental disorder. Pförringer (76) concluded that the affect (excited) curve in circular insanity shows directly proportional (accompanying) changes in the weight curve.

The rather comprehensive studies by Schultz and Knauer (17) upon the carbohydrate metabolism in those suffering from mental disorders have demonstrated some interesting facts. Their most constant finding was that in patients suffering from depressive or *angst* states there occurred a glycosuria, more often and intensively associated with the latter. A further important observation was that this glycosuria varied quantitatively with the changes in the mental condition—with a betterment of the latter there occurred a decrease or disappearance of the glycosuria. However, Schultz and Knauer showed that it was a matter of indifference whether the depression was primary or secondary or with what disease type it was associated. Glycosuria was noted not only in the depressed phases of manic depressive psychosis and "melancholia," but also in episodes of depression occurring in imbecility, dementia precox and general paralysis. It is seen then that though the glycosuria occurs, it is to be considered of no more than symptomatic value and not as characteristic of any one psychosis, occurring in all depressed states irrespective of the underlying psychosis. The nature of the mental relation seems from the above remarks to be quite patent. Were it to be looked upon as a cause of the psychosis, it would be fair to expect that it should occur in association with the manic as well as the depressed phases. The entire evidence is in favor of the assumption that glycosuria occurs secondarily and as a result of the mental disturbance, in other words, it is to be considered of neurogenic origin.

The conclusion which may be drawn from these considerations is that in manic depressive insanity there do occur certain disturbances of metabolism, possibly indirectly resultant from the mental disorder, but that these disturbances cannot be considered as in any way characteristic of this psychosis.

EPILEPSY.

Among those diseases of the nervous system wherein attempts have been made to demonstrate by chemical research some disorder, epilepsy occupies the first place. There are several quite obvious reasons why chemical studies have so frequently been made with those suffering from this disease. The very striking clinical picture of the disease, the sudden seizures which occur without outwardly apparent causation naturally attracted attention. The absence of a visible lesion demonstrable anatomically led to the assumption that the causal factor in producing the attacks must reside in some disturbance of tissue activity and analogies to other known toxic conditions presenting somewhat similar clinical pictures offered contributory evidence in support of this assumption. The vast majority of all observations have dealt almost exclusively with the one spectacular feature of the disease, the seizure. Repeated attempts have been made to discover in the various body fluids, and because of the ease principally in the urine and blood, some abnormal substance or an increase in a normal one, which may be looked upon as causative. Very few have studied the metabolism of the epileptic organism during the interval between attacks. It is only recently that such studies have been carried on, and it is obvious that by these more extensive researches only are we to hope for any exact understanding of a possible metabolic disorder of which the convulsion is but a periodic manifestation.

In reference to the effect of the attack upon the metabolic processes, one of the oldest observations is that the volume of urine is increased. This common observation Rohde (77) was able to confirm and further he noted that the subsequent oliguria exactly compensated the previous polyuria. Albumin and casts have been found in the urine after attacks and in instances where a renal lesion could be eliminated with certainty. However, this is not a constant urinary finding. Rohde was of the opinion that the post-paroxysmal albuminuria found its cause in renal irritation provoked by substances excreted with the urine during the attack. The albuminuria is generally of a quite transitory character, though may persist for a day or two. Glycosuria has been noted, but it is the general opinion that sugar in the urine is not in any way due to epileptic processes.

Although older observations tended to show that the chlorides of the urine varied quantitatively from the normal amounts, more recent work shows that this inorganic constituent both during the intervals and the days of the attack evidences no variation from the normal. So also the idea that there occurred some disturbance of phosphorus metabolism associated with the seizure has failed to be confirmed by subsequent work. Most uniformly it has been reported that phosphates were increased following an attack, but sufficient attention has not been given other factors which influence phosphate excretion to make these results of any value. In some instances (Rohde) variations in the gross protein metabolism have been noted—a disturbance of nitrogen-equilibrium. This, however, is not constantly observed and its portent is of secondary value so far as is known.

The relation of uric acid to epileptic attacks has received a great deal of attention. The criticisms of uric acid studies made previously are well illustrated in the considerations of epilepsy. The importance of distinguishing between endogenous, *i. e.*, that which has to do with tissues, and exogenous, or that which has to do with foods, has commonly been quite overlooked. It has long been observed that the nature of the diet in the epileptic seemed to bear some direct relation to the number and possibly the severity of the seizures. Rosanoff (78) has recently experimented upon the effect of diet on the number of seizures. On a poor protein diet he found the number of seizures less by 14% than had been with usual hospital diet (approximately so called standard diet). Since the time of Haig confirmation and denial of his work have been equally frequent. Krainski (49) found a very evident disturbance in the uric acid excretion, an increase directly after attack. Coincident with this he found an increase in the quantity of ammonium carbamate in the blood and concluded that the attacks were due to the toxic effect of this substance, which he considered a precursor of uric acid—its increase being due to some synthetic disorder. Mainzer (79) could determine no such constant relation between seizures and uric acid excretion. On the day when the seizure occurred there was an increase (slight) of uric acid excreted, but also there was an increase, even greater, on days when no attack occurred. Regarding Krainski's experiments concerning the toxicity of the ammonium carbamate and its ability to reproduce epi-

leptiform seizures in rabbits, Mainzer shows that ten times the amount of carbamate present in Krainski's experiments is necessary to produce the effects in a rabbit. Binswanger (80) could not substantiate Krainski's claim of toxicity and Rohde could not see that the amount of uric acid excreted is in any way related to the severity of the seizure. Rohde did notice some disturbance in the interval period which he explained by assuming a decreased ability of the epileptic organism to utilize purin bodies. Rohde's attempts to explain the increased uric acid output as dependent upon a coincident destruction of leucocytes, on the ground that he found 14,000 to 15,000 leucocytes and a slightly increased phosphorus output, is to be accepted with some conservatism. Microscopical evidences of deteriorating leucocytes is not sufficient to show that they are destroyed in sufficient quantity to produce changes in the urinary constituents of the nature in question.

Both Kauffmann (75) and Rohde (77) have noted a marked increase in the acidity of the urine, both agreeing that this is largely due to lactic acid and also to some other unidentified fatty acid. Kauffmann postulates that attacks are due to an acidosis dependent upon disturbances of carbohydrate metabolism, but the experimental data upon which he bases this conclusion is entirely insufficient and does not withstand criticism. He evidently concluded that there was an increased acidity because of an increased quantity of ammonia in an obviously decomposed urine! Bornstein (81) from his respiratory experiments concluded that there was no disturbance due to the epileptic constitution as such, but that due to an attack there were variations in metabolism which indicated variations characteristic of decreased oxidative processes.

Cholin has been more or less accepted as an agent in the production of epileptic attacks since Halliburton's announcement of its occurrence in the cerebrospinal fluid in conditions where there was destruction of nerve tissue. There is no adequate confirmation of its importance in epilepsy. Pighini's (66) findings in the cerebrospinal fluid of epileptics are interesting. Next to paresis, in this disease he found cholesterin most frequently in the spinal fluid, and also was able to note some definite relation between the amount of cholesterin present and the severity and frequency of the epileptic seizure.

Comparatively recent work regarding the relation (82) of dis-

turbed function of the parathyroid bodies to spasmophilic conditions in general and to tetany in particular, has tended to show that undoubtedly these glandular structures exerted some influence upon calcium metabolism in such manner that disturbances of the function of the nervous system were produced which directly resulted in the abnormal motor manifestations. In epilepsy it has been found (Bornstein and Stroman, 83), that during the seizure there is a marked increase in the excretion of calcium and magnesium in the urine associated with a very much slighter increase in the phosphoric acid output. Following the attack there appears to be a retention of all three of these elements. No explanation of these changes, in so far as their relation to epilepsy is concerned, has been offered. At least, the analogy is obvious.

In conclusion it may be said that in epilepsy there are indications of disturbances of metabolism, as seen in the variations in oxidative processes, the disturbance of excretion of uric acid and the cholesterin increase in the cerebrospinal fluid. However, the exact nature of these disturbances and what definite relation they may bear to the disease process must be left an open question.

PARESIS.

In general paralysis we meet with a disease in which there is usually no difficulty in the diagnosis—at least when compared with other mental disorders, such as dementia precox and manic depressive insanity. In the consideration of the results this, then, is one element of uncertainty which, to a degree being obviated, may lessen the inaccuracies arising from unknowingly comparing dissimilar states. Yet that this source of error cannot be disregarded is very well shown in an instance reported by Folin (3) wherein most extensive metabolism studies were carried out on a supposed case of manic depressive psychosis, where the autopsy subsequently showed lesions of paresis. Such possibilities of diagnostic error have been diminished greatly by the present serologic and cytologic examinations of the cerebrospinal fluid which are now in use.

Of the various agents which have been proposed as the causal factors in the production of the paretic seizure, none have withstood analysis. In paretics variations in the weight are noticeable, especially those gradual changes occurring as the disease process progresses. In spite of the often excessive food intake, a gradual loss of weight is not uncommonly observed. Also transient varia-

tions in weight are to be noted as in other psychoses. Kauffmann (74) believes that these find their explanation in the disturbance of the water balance—the paretic organism is not able to retain water. Nor can this loss of water be compensated by subcutaneous infusions of salt solution. Glycosuria has been observed, but it has not been shown that its occurrence bears any specific relation to the disease process. Kauffmann found it associated with *angst* states and this was more recently observed by Schultz and Knauer (17). Albuminuria is a not infrequent accompaniment of the paretic seizure, but that it has any significance other than that there may be a coincident renal lesion, has not been demonstrated. Kauffman (74) was unable to demonstrate any distinct disturbance of total protein metabolism in his studies other than slight variations associated in time with occurrence of a seizure, and these were not definite or constant.

Associated with the seizure Kauffmann noted variations in the output of sulphur and phosphorus and more especially of the neutral sulphur which he found to be greatly increased coincidently with a decrease in the inorganic fraction. Variations from the usual normal of the ratio of nitrogen-sulphur excretion were especially noted by Folin (3). So evident was this change that Folin considered it "by no means impossible that the correct interpretation of the changed nitrogen-sulphate ratio in general paralysis will be found in the existence of a quite profound metabolism disorder involving an excessive destruction of body protein containing a smaller percentage of sulphur than that of the diet." Although there were variations in this ratio more marked than in patients suffering from other psychoses, the most noteworthy point was the marked tendency toward a lowering which was noted in paretics. However, subsequent work has appeared to show that this apparently significant change is not constant, on the other hand, a rather high ratio was obtained. It was thought that possibly the duration of the disease might have some bearing on the findings, as higher nitrogen-sulphur ratios were found in those cases wherein the disease process was not only farther advanced in time, but decidedly so clinically. Whatever the explanation for these variations may be, it certainly appears that a high nitrogen-sulphur ratio often occurs in cases of general paresis and that the reverse of this cannot be considered peculiarly indicative of this disease.

The neutral sulphur was found to be high in the majority of instances, while the ethereal sulphates were low—on one occasion absent (84). Folin's (3, 11) observations on a paretic in whom there occurred most marked and regularly alternating changes in mental condition from day to day, "being one day little removed from the normal, while quite disturbed on the other" is of interest. Associated with the alternations of mental state there was a corresponding, unmistakable periodicity in the elimination of phosphoric acid through the kidneys, being excreted in greater quantity on the nervous days. Folin did not regard this observation as more than a "most striking illustration of the remarkable tendency on the part of general paralysis to exhibit greater than normal fluctuations in the urinary constituents." These and other marked fluctuations which this observer noted were thought to explain the contradictory results in the earlier metabolism literature of paresis, and also that although paresis may be essentially a metabolism disorder, there is as yet insufficient proof.

Kauffmann from his experiments was inclined to the opinion that there occurred in paresis some disturbance, a diminution of oxidative processes, which occasioned an accumulation of intermediate metabolic products which in turn acted as toxic agents. This idea was not substantiated by Bornstein (6) who was able to discover no disturbance in the normal respiratory quotient in paresis. It must be admitted, however, that the difficulties met with in the conduction of Bornstein's experiments may have given rise to conclusions which may not, as yet, be taken as final.

Pighini's (66) observations of the spinal fluid showed that cholesterin occurred in 88% of the cases of paresis. This finding is, however, not qualitatively indicative or characteristic of paresis, as this substance was likewise found in epilepsy and dementia precox; most frequently in paresis.

It was mentioned that considerable study has been devoted to the behavior of the lipoidal substances, notably the lecithins, in diseases of syphilitic origin. These observations are as yet far from complete, and in view of the unsettled condition of our knowledge concerning this whole group of substances it seems best to simply record the facts without further comment. Peritz (57) believes that the syphilitic "toxin" combines with lecithin to form a toxolecithid which is excreted in the feces. As a result of this removal of the available lecithin by syphilis, the organism becomes

poor in it and, owing to this impoverishment, paresis and tabes result. In confirmation of his theory, he finds in syphilitics, tabetics and paretics a blood serum with a high lecithin content. Further, associated with an increased excretion of lecithin in the feces in metasyphilitic diseases, Peritz discovers a very marked decrease of the normal amount of lecithin in the bone marrow in these diseases. Glikin (58) also found that in paresis there occurred a decrease of lecithin in bone marrow, yet he was not certain that this might not be explained largely by the age of the individual. Koch (59) showed that in paresis, although there did occur some decrease in the lecithin content of the brain, there was yet a relatively sufficient supply remaining in the most severe destructive processes, and he has further indicated that the nervous system tends to keep its relative composition constant in pathologic states more than any other tissues.

VII.

A rather incomplete survey of the chemistry of nervous and mental diseases, such as has been given in the foregoing pages, cannot pretend to exhaust our knowledge of the subject. As was stated in the beginning an attempt has been made to consider briefly some of the more important findings which have been recorded. It is principally the results which have been dealt with, features that are of greater interest to the clinician. The facts which have been produced by the chemist, not the chemistry itself, are more of immediate value to the psychiatrist.

It is found that we are in possession of a considerable number of observations concerning metabolic processes and their relation to the central nervous system. These, however, are mostly of a quite negative character and at the present time we know of no disturbance of nervous function which is regularly associated in an unvarying manner with the chemical findings. In some instances the indications are somewhat less obscure and, though, as yet, the knowledge which may be derived from further observations along similar lines is far from complete, still there is sufficient accumulated evidence to authorize the continuance of further research. What the more recent trend toward the study of tissue chemistry will bring forth is still a matter of uncertainty. The more generalized study of the nervous system from this point of view is of quite recent origin and in its development is yet in the

stages of infancy. It would seem that from the older methods of attacking the subject little more information is to be derived than that there do occur rather commonly in those suffering from some of the forms of mental and nervous disorders some more or less widespread disturbance in the metabolic processes. These disturbances are quite irregular and varying in their occurrence and do not appear to be associated constantly with any one type of disease of the central nervous system. From this it is obvious that those disturbed chemical activities which are observed cannot be considered to be related either as cause or effect with any one type of mental disease. In other words, we have by these methods found no metabolic change characteristic of any one disorder of the central nervous system.

Koch's studies of the chemical composition of the brain in health and disease have so far indicated that possibly by this method some definite facts may be derived. His finding in the brain of those suffering from dementia precox a variation in the amount of neutral sulphur, coinciding as it does with the observations of others working from different directions, seems to indicate that in this disease there does occur rather constantly some disturbance of chemical relationship. In the study of the chemical composition of nervous tissue the lipoidal substances are assuming a position of rapidly increasing importance. We know almost too little of the definite chemical nature of the members of this group of substances to formulate accurate conceptions concerning their possible importance in the nervous system, particularly with reference to what part they may play in conditions of disease. Work so far has shown that there is some disturbance of lecithin metabolism in paresis, and possibly also in other disorders dependent upon luetic infection. A second field in which there seems to be great promise is the study of the relationship obtaining between the nervous system and internal secretions. Here, too, certain facts have also been established, especially regarding the thyroid and parathyroid glands. The association of a decreased function of the former with myxedema and its coincident mental changes, and the spasmophilias resultant upon a disturbed activity of the latter offer indications of their physiologic importance in connection with the proper functionating of the central nervous system. Results obtained so far do not permit of satisfactorily complete explanation at present of the manner by which these effects are meditated. Al-

though an excellent subject for speculative possibilities, it is evident that little is to be gained from such mental exercise.

In conclusion it may be said that chemical investigation of nervous and mental diseases is progressing, to be sure slowly, in a manner to justify the hope that by it we may, in the not far distant future, obtain such information as will aid in the more complete understanding of the normal as well as the pathologic physiology of this organ.

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THE "IMPRISONMENT PSYCHOSIS" WITH REPORT OF CASES.*

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The so-called imprisonment psychosis has been recognized and discussed by foreign writers, chiefly German, for some twenty years past. Most of the authors are united as to the nature and expression of this rather indefinite symptom-complex, but differ as to whether it is entitled to be classed as a disease entity, occurring apart from the more familiar mental disorders.

Siefert, (1) after discussing the difficulty of diagnosing the ordinary psychoses as modified by imprisonment, speaks of the great and almost immedite alteration, after their transfer to the insane department, in the mental condition of certain prisoners who are violent, destructive and irritable or who "make weak attempts at suicide, brood stupidly to themselves, become mute, show anxious confusion and active sense deceptions."

"No greater contrast, however, can we conceive than that which exists between the clinical picture depicted in the prison and the condition of the same individuals in the asylum—here we find them usually quiet, orderly, easy to guide and to hold in conversation, about 90% willing to work—numerous psychotic phenomena, notably confusion conditions, frequently disappear at once."

Mönkmöller (2) doubts the existence of an imprisonment psychosis *per se,* as seen by the following extracts from his excellent monograph—"Formerly it was believed that a definitely determined position could be assigned to psychoses produced through imprisonment, so that they might disclose their origin as a disease *sui generis* through their symptom-complex. Now one is more inclined to consider only a characteristic coloring as suggestive. In essence, it is a question of longer or shorter hallucinatory episodes which bear, now more the character of

*Read at the sixty-seventh annual meeting of the American Medico-Psychological Association, Denver, Col., June 19-22, 1911.

melancholia, now of paranoia and *above all* of *acute confusion.* Characteristic of them is the vividness of the hallucinations of hearing and the occurrence of many delusional presentations which adapt themselves to the environment. After release from confinement, or often even after release from solitary confinement, these symptoms disappear and by suitable treatment the prisoner recovers completely. Not seldom the imprisonment psychosis takes on chronic characteristics if the proper attention is not paid to it; or nothing more may be noted of the acute attack while the symptoms of a general psychic degeneration or of a chronic psychosis come to light."

Rüdin (3) has paid considerable attention to the subject of imprisonment psychoses. He describes the symptom-complex under discussion to be characterized by "the onset of hallucinations of hearing and sight, delusions of injury and persecution, anxious conditions, depression and irritability. It is, in a manner, an hallucinatory episode which develops during imprisonment in an existing or incipient foundation-disease or may arise as something entirely foreign." Rüdin found this condition to exist in 28 of the 94 cases of insanity in prisoners which he examined. Concerning the rôle of imprisonment in the etiology he says "only this may with certainty be deduced, that either solitary confinement or a long series of previous confinements, in conjunction with the still considerable deprivation of liberty of collective imprisonment, can be drawn upon as the cause of the development of these symptoms. After the lifting and the combating of these causes the symptoms disappear."

Dr. North (4) of Dannemora, in his very interesting study of insanity among adolescent criminals, presented to this association last year, states that about 45% of the adolescent criminals admitted at Dannemora, or about 15% of the total number of admissions, have been diagnosed as cases of "imbecility with insanity." He considers these mental symptoms arising in defectives as being due to their inability to live under prison discipline and their natural instability, and speaks of the symptoms as usually including "depression, elation, excitement, disturbance of attention and apprehension, delusions and hallucinations, often of a dreamy character. Not infrequently the patient is free from the more serious symptoms in two or three days after admission

to the hospital for the insane and in a week or two may be, so far as can be determined, in his normal condition, which proves to be that of the defective youth described."

This symptom-complex, as described by Dr. North, is evidently essentially the same as that designated as the imprisonment psychosis by foreign writers. While Dr. North would apparently restrict its occurrence to the imbecile types, the German writers speak of it as occurring also in association with the various usual psychoses as dementia præcox, paranoia, etc.

Dr. North's findings that, of all the admissions at Dannemora, 36% were adolescents who averaged 21 years of age and that it was among them that he noted the transient symptom-complex described, agree closely with the conclusions reached by Siefert (1). The latter says, "As to the question whether an imprisonment psychosis or a true psychosis is present, a consideration of the age at which the criminality and the psychosis developed is of the greatest importance. A psychosis developing after 30 years of age is usually organically founded, one starting beyond the 20th year is also usually of real psychotic origin—a psychosis in the third decade of life in one who has recently become criminalistic is usually a true and not an imprisonment psychosis." This very palpably leaves only those cases developing at 20 years of age or younger to be classed among the imprisonment psychoses proper, according to Siefert's view.

The cases which have particularly attracted my attention have been quite similar as to their symptom grouping and were characterized by a partial stupor of a depressive nature, with associated apprehensiveness and sometimes delusions of persecution and hallucinations of hearing and sight. The transient nature of the psychosis particularly interested me, but it was not until I had seen a very typical case at Kraepelin's clinic last fall that I recognized the real nature of these cases and their place in the classification.

The following case fairly illustrates the type:

Case I.—W. H. E., age 21, electrician, married at 18 and has one child. Father is a bartender and is divorced from mother. I was unable to elicit any further family history of significance. As a child he is said to have learned fairly well in school, quitting school at 14 years of age. He claimed to have made $2.50 to $3.00 per day as an electrician.

The patient was arrested for stealing a bicycle which he stoutly maintained he had bought from a stranger but, as he could show no receipt, he was found guilty and was sentenced to six months imprisonment.

A few days after the beginning of his sentence he began to be fearful, thought other prisoners were chasing him, could see men in a corner of his cell with a rope to hang him; he heard strange noises, thought his food was poisoned and was afraid of everything. He was somewhat destructive.

About four weeks after the beginning of his sentence he was transferred to the State Hospital for Insane at Norristown. Physical examination on admission revealed nothing abnormal except a head and face of a somewhat defective shape, the lower jaw being of the very heavy type commonly associated with the criminal classes. No anæsthesiæ or other hysterical stigmata were noted.

On admission the patient refused to talk, appeared apprehensive, drew away when anyone attempted to approach him and constantly made a low moaning sound. Later in the same day he answered questions hestitatingly but resumed the moaning when his attention was not engaged. In answer to questions he expressed the ideas stated above as to his treatment in prison.

Two days after admission he talked readily and no longer moaned. He stated that he had received a six months sentence, but after that remembered nothing until he came here. He denied that he had refused to talk on admission or that he was afraid of anyone.

Four days after admission he was cheerful, wrote to his wife and assisted in the ward work. He continued to improve and was finally discharged as restored at the end of his six months sentence.

In this case there was evidently a somewhat defective basis, though it was not nearly so marked as in some of my other cases. The factor of the injustice of the imprisonment, real or imaginary on his part, evidently played an important rôle in bringing about the psychosis, as he frequently spoke of this when his mental condition improved.

CASE II.—H. A., single, age 20, tailor by occupation. Maternal grandmother, mother and maternal aunt are all said to have been insane. As a child he wouldn't go to school. Stole from his father and from several stores. He would not work though he was given several positions. Was twice committed to the Boys' House of Refuge. Thought he was not treated as well as the rest of the family. Threatened and choked his stepmother.

On April 29, 1907, was sentenced to six years in the penitentiary for burglary, having fallen in with two professional burglars.

A year or so after entering prison he began to have the idea that the dentist and one of the guards had conspired to poison him. He tried to stab other prisoners for imaginary wrongs. Refused his own food but would eat that of his cell-mate. He was easily rendered excitable on slight provocation, was noisy and violent at times.

On admission to the Norristown State Hospital, October 19, 1910, physical examination revealed nothing except some of the degenerative stigmata such as a high arched palate and a malformation of one ear. When questioned he answered in a low voice and appeared fearful and apprehensive, at times becoming somewhat lachrymose. Said they had a drug at the penitentiary "to put you out of the way if they didn't like you."

His apprehensiveness gradually disappeared during the first ten days of his stay in the hospital. There is remaining, however, a very evident defective mentality. He is suspicious and inclined to think that others fare better than he. Becomes very angry on slight provocation, and at times has real frenzies of rage when crossed. This defectiveness is so apparent and pathological as to render him unfit to live outside of a hospital for insane.

He is classified well in his present condition under the heading of the so-called moral insanity or moral imbecility.

In Case III there was apparently some mental disturbance prior to the imprisonment if the testimony of relatives can be believed. However as seen by the following account, the condition assumed a very different aspect after he entered prison.

Case III.—B. U., age 27, married, farmer. His father is a moderate user of alcoholics, otherwise the family history is negative. He has three brothers and five sisters living and apparently normal. He is said to have been as bright as other children but had little schooling. His mother claims that he has had peculiar seizures, apparently epileptic, several times a year from childhood, but her inability to describe these attacks and her general manner throws some discredit upon her statements. It was also stated that two years before admission he was noticed to be exalted and boastful at home and would laugh and talk to himself. A year after this he left his wife, went off with another woman, hired a horse and later sold it. He was sentenced to ten years in the penitentiary for the larceny.

Four months after entering prison he was noticed to be peculiar in his actions. At times would refuse food and destroy clothing. At one time stated he couldn't hear, at another that he couldn't talk, took little interest in his surroundings and lay in bed most of the time.

On admission to this hospital, March 9, 1908 (after 10 months imprisonment), the patient was in a condition of partial stupor and appeared very apprehensive. Answers to questions were difficult to elicit, were not always relevant and were given in a jerky, whiney voice. He exhibited at first a peculiar distorted wrinkled expression of countenance which, together with a tendency to mannerisms and resistiveness at times, somewhat suggested catatonia. He sat with head bowed, holding his face between his hands or stood about in doorways as if afraid. Was lachrymose at times.

Physical examination showed poorly formed ears, a high arched palate and the general effect of one with a poor mental endowment. Deep reflexes were overactive. It was impossible to secure a good examination of the sensory fields. Nothing otherwise of an abnormal nature was noted.

Five days after admission he was eating well, though he ate poorly at first. Seven days after admission he said he felt better but became lachrymose when asked about his trouble.

On the eleventh day he helped with ward work and wrote to his wife. The following day he denied all knowledge of the crime or his confinement in prison. Continued to grow more cheerful, gained in weight but was always evasive in regard to his crime and imprisonment, usually maintaining that he didn't remember them. He eloped four months after admission but was returned three weeks later. Upon his return there was a slight tendency to a reversion to his old symptoms but this soon subsided and he was returned to prison, apparently restored, to serve the remainder of his sentence, August 19, 1908, six months after admission. There has been no recurrence of his psychosis since his return to prison.

While there was a possibility of malingering in this case it did not so impress us at the time and the case seems to correspond rather closely with some of those described as the imprisonment psychosis. The Ganser symptom-complex was also strongly suggested as the Ganser symptom of approximate answers was noted at first to a certain extent.

The peculiar admixture of true psychotic symptoms with an evident desire and intention to malinger in certain of these imprisonment cases furnishes one of the most complicated mental groupings imaginable. I have in mind two excellent cases illustrative of this type.

CASE IV.—J. P., age 33, native of Austria, married, machinist by occupation. Father was a heavy drinker otherwise nothing of an abnormal nature could be learned of his family. He came to America at about 18 years of age. A few years later he married against the wishes of the girl's father who later induced the wife to return to her former home. It is claimed that the girl became pregnant by her own father and when the patient heard this he became moody, brooded a great deal, couldn't sleep and finally determined to kill his father-in-law, which he later did.

On September 30, 1901, he was declared guilty of murder in the first degree. On April 24, 1902, his sentence to death was commuted to life imprisonment by the Board of Pardons. March 3, 1906, he was admitted to the State Hospital at Norristown. On admission he was stubborn, resistive, violent at times, and refused food. He talked at first in a slow, hesitating manner but soon became mute. He seemed very apprehensive. Physical examination was impossible owing to his resistive tendencies.

One week after admission he stated privately to an attendant that he hadn't spoken for three years while in prison and that he had made a

mistake by speaking here. He said he acted thus under the advice of his lawyer who told him that after he was sent up here he could be gotten free. He requested pencil and paper so that he could write to his mother at night and have the letter mailed secretly.

Two weeks later another attendant reported that the patient talked to him when no one was observing; talked well but asked the attendant to report to the doctor that he talked "crazy." He asked if there was any chance of his being sent back to prison and said the doctors might send him back as cured—he was sorry he had talked so much.

January 5, 1907, he ate voluntarily for the first time, having been fed mechanically before. Still bites, scratches and struggles when an attempt is made to care for him. April 1, 1907. Has gradually improved until now he is up and about, talks a little, is tidy and does some ward work. August 12, 1907. He talks readily, and his mental condition is normal save for occasional periods of mild depression and a slight tendency to be emotional at times. Physical examination since he has improved shows a defective type of face and the head is poorly shaped. Hair coarse.

September 17, 1907. Returned to prison as restored. There has been no record of a recurrence in this man's case.

Case V.—G. N., age 23, single, a carriage painter. Little is known of the father. The mother was very quick tempered. The patient was the youngest of twelve children, one of whom is weak-minded and is in a training-school for the feeble-minded at present. It has been learned that he got on poorly in school and went to work at 9 years of age. He was violent tempered and dissipated, using liquor and possibly also opium. He was a cigarette fiend, and admitted having been infected with gonorrhea but not with syphilis.

The patient murdered his mother with a hatchet while in a fit of rage because she refused him money. He was found guilty of murder in the first degree; but subsequently, having developed symptoms of insanity while in prison, he was sent to the Norristown State Hospital December 26, 1904.

Upon admission he was in an apparently semi-stuporous condition and continually made a low moaning sound. Urinated in bed.

January 27, 1905. Continues apparently in a stuporous condition. Eats only when fed with a spoon. Will now roll out of bed and catch himself but will urinate on the floor unless placed upon the commode. Never soils himself with feces. Is mute and takes no apparent interest in his surroundings.

February 15, 1905. (Seven weeks after admission.) While only one attendant was on the hall, most of the other patients being out of doors, the attendant noticed that a patient in the bed next to N— was uncovered and went to cover him. N— caught hold of attendant, stating that he had pulled off the covering of the other patient purposely to get the attendant to come near so he could talk to him. He said: "I want to tell you something as you are the only fellow I see that I can trust. I am

playing the game here as I want to save my life. You know the terrible crime I committed. Don't tell anyone that I talked to you, especially—— (another attendant), as he is a two-faced fellow. He was talking about you the other day." At this point a patient was heard approaching, N— stopped talking and resumed his moaning sound.

April 1, 1905. Takes food voluntarily from tray. Moaning sound continues. Will not walk without assistance.

June 12, 1905. For the first time walks unassisted. Answers questions coherently but with diffidence. Observes everything but seems not to do so.

April 1, 1906. Quiet but cheerful, talks little. Works well on the ward.

After the above date the patient gradually gained in self-assurance until at the end of another year he was apparently as normal as was possible for him. His physical appearance, however, suggested decidedly the defective, the head being poorly formed, also the ears, the nose unnaturally long and the chin very weak and vacillating. The patient has shown a tendency to grow irritable easily and then will strike, though he has gained much in self-control in the past few years. He is jovial as a rule and somewhat boastful in manner. He is very much devoted to the interests of the hospital and has often prevented the escape of other patients by alertness and by lending active assistance. The interesting fact about his present condition is that any little discipline or harsh language from one in authority will at once bring on a slight recurrence of his old symptoms; he becomes moody, silent and morose and has the old apprehensive look to a degree. He is perfectly satisfied at the hospital but apparently is in more or less constant fear of being returned to prison to suffer the penalty of the law.

I have not the slightest doubt that a return to prison would at once bring on his former symptom-complex though perhaps in a modified form. He is plainly an imbecile both as to his physical and mental traits, and his powers of resistance to anything in the way of hardship, unkindness or discipline are far below the normal.

To trace, however, the exact relation of the simulated (for there was evidently an intent of simulation here) to the real psychotic symptoms, in cases such as the last two, is a most difficult task. On this point Mönkmöller says, "As a physician one must be very cautious in making a diagnosis of simulation since the fate of one branded with the mark of "simulator" is not, to say the least, bettered. Many acute forms take on a very wonderful character and can conceal, under a mask of obvious simulation, a more or less pathological personality."

The real facts, no doubt, are that the real and simulated symptoms are so closely intermingled in the mental picture that it is well nigh impossible to differentiate them. We may suppose, however, that the temptation to simulate insanity comes sooner

or later to many prisoners, especially those of unstable personality whose whole lives have been devoid of self-discipline of any sort and who cringe before the necessity of undergoing rigorous prison regime for a period of time.

The confinement within four walls (especially where the confinement is solitary) cuts off many sources of the usual external sensory stimuli, and under such conditions, as suggested by Rüdin, the various organic stimuli (such as the vascular sounds in the middle ear) assume an entirely abnormal prominence and may give rise to hallucinations or illusions. The digestive disturbances likely to arise from poor food and insufficient exercise may easily give rise to the idea that the food is poisoned and this suspicion is only confirmed in the mind of the prisoner if sedative medicine is administered in his food.

The apprehensive state developing as a result of hallucinations and delusions of such nature may well merge into a condition of partial or complete depressive stupor and it is often at this stage in the disease that the prisoner is transferred to the hospital for insane.

Now as the patient gradually or rapidly improves under the pleasanter and more natural surroundings of the modern hospital for insane, the process of recovery will go on uninterruptedly if there has been no initial thought of simulation. However, if such an idea were present in the beginning, but was buried in the avalanche of true psychotic symptoms, it is most probable that, as the clouding of consciousness disappears and the patient realizes that he is in an insane asylum, the thought of simulation will recur to his mind, and, lacking insight and possessing more or less complete amnesia as to the events surrounding his entrance to the hospital, he will arrive at the conclusion that he is in the hospital because of this simulation and that, if he is to stay there instead of being returned to prison, he must continue to show mental symptoms.

Such a line of thought helps to explain the actions of the last two cases reported. If these men had been genuine malingerers it is hardly probable that they would have confided in anyone, much less an employe of the hospital. One of the men (Case IV) within a week following admission stated or at least implied that

he was malingering, which would never have been done by a shrewd sane man bent on a deception of this character.

The relation of this symptom-complex to hysteria is uncertain and not fully established.

In discussing a very typical case of this kind shown by him at a clinic (November, 1910), Kraepelin stated that the man had certain stigmata of hysteria, as constriction of the visual fields, and that he considered it a disease related to hysteria, though not wholly hysterical in nature. Other authors are slow in committing themselves on this point though all consider it of psychogenic origin. Hysterical stigmata were noted in only one of my cases.

As to the relation of the symptom-complex under discussion to the other psychoses, we have much authority for the statement that it may be seen in conjunction with and complicating almost any of the usual psychoses. Personally I have seen it only complicating a case of the depressed type of manic insanity or at least the history and course of the case thus far (the patient having been in the hospital only a few months) would seem to warrant this diagnosis. Otherwise all of my cases (numbering nine in all) have been developed simply on a basis of mental and moral defectiveness.

CONCLUSIONS.

1. The symptom-complex under discussion cannot be regarded as a disease entity.

2. It develops most often in the adolescent or young criminal.

3. While it may complicate other psychoses it very often occurs simply upon a markedly defective basis, which in some cases amounts to imbecility.

4. It is not infrequently associated with evidences of an attempt at simulation.

5. While related to hysteria in nature it can hardly be regarded as a hysterical psychosis, though of psychogenic origin.

6. Great apprehensiveness with partial stupor, hallucinations of sight and hearing, and often mutism are frequently the most prominent symptoms. Their rapid disappearance upon transfer to a hospital for insane is usual and striking.

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A STUDY OF CERTAIN SERUM REACTIONS IN THE BLOOD SERUM OF GENERAL PARALYTICS, AND ITS FAMILIAL ASPECTS.*

By HENRY C. EYMAN AND JOHN D. O'BRIEN.

"And the blood thereof is the life of the flesh thereof."

The importance of this particular constituent of the human organization has long been recognized. Medical men have realized its supreme importance, and from the days when the barbers were the surgeons and painted their signs to represent the flowing blood, down to the present day "the blood thereof" has been regarded as "the life of the flesh thereof."

Every organ of the body, and every tissue thereof, is nourished by it, and it is also the source of every secretion. How important then must be its function, and how disastrous when from want of proper functionating of the vessels which carry it, or from toxic changes, or from some cause which produces a disproportion of its constant constituents, we have an anemic condition, a hyperemia, or a blood dyscrasia.

As you all know normal blood is composed of red corpuscles, small bi-concave, floating disks, white corpuscles, leucocytes, cells of protoplasm having ameboid movements. The red corpuscles contain hæmaglobin, and are consequently oxygen carriers. The white corpuscles take up foreign particles in the blood. The plasma is the colorless fluid in which the corpuscles float during life. The number of red corpuscles in a cubic millimeter of blood originally estimated by Welcker at 5,000,000 for men, and 4,500,000 for women, has not been materially changed by later observers, though the trend of opinion seems to be that the estimate is rather too low. Some investigators having obtained an average of 5,900,000 and one of 6,000,000. There is also a slight difference in the observation of investigators as regards the relative number of red corpuscles of men and women. Welcker hav-

*Read at the sixty-seventh annual meeting of the American Medico-Psychological Association, Denver, Col., June 19-22, 1911.

ing placed it at 500,000 and more recent writers at 1,000,000. It has been well demonstrated that the nervous system is a large factor in effecting alterations in the quality of the blood. It has been demonstrated that section of the cord above the origin of the splanchnic nerves is followed by general dilatation of the blood vessels, and reduction in the proportion of red cells. Also that vaso-motor paralysis is followed by local and general increase in the volume of blood with diminished specific gravity and proportion of red cells, while in constriction of the vessels we have an increase of specific gravity and an increase in the proportion of red cells. Therefore the therapeutic value of cold baths, which is almost necessarily followed by contraction of the vessels, and consequent increase in proportion of red and white cells, and the opposite effect of the use of the hot pack, and the inhalation of amyl nitrite. You will recollect that one of the means of differentiating the delirium of cerebral anemia from the delirium of cerebral hyperemia is the use of amyl nitrite as an inhalation. In hyperemia we have almost immediate relief, and in anemia an intensification of symptoms. Many authors have observed the influence of psychical emotions on the character of the blood in different regions of the body. Under the influence of intense emotional excitement the proportion of red cells changes in an incomprehensible manner.

Dr. Jacobi reports a case of an hysterical woman, whose blood examination showed on November 12th, 3,892,000 red cells; on December 11th, 8,084,000 red, and 192,200 white; on December 16th, 3,393,000 red, and 22,000 white. Our own observation on an extremely hysterical patient shows an almost equally radical change in number and proportion. Massage and electricity will cause an immediate increase in the number of red cells. Of course there is a physiological variation in the volume and composition of the blood according to the constitution of the individual and the degree of muscular development. Then there is a great variety of physiological conditions, producing marked but transitory changes in the blood, such as active digestion, muscular exertion, profuse perspiration and temporary cyanosis.

Now I would say in the study we have made of serum reactions and blood conditions we have taken all these normal changes into

consideration. Knowing then the extreme importance of blood conditions these studies were based upon the known departures from the normal.

The sero-diagnosis of a syphilitic infection commonly known as the Wasserman reaction, is based upon the work published by Bordet in 1899, and Bordet and Gengon in 1901. In 1906 Wasserman applied the method of Bordet and Gengon. It was then shown that the absence of hæmolysis could be made available as a naked eye test indicative of specific infection, and that the occurrence of hæmolysis negatived the existence of such infection, serving to demonstrate the presence or absence of the body arising from a syphilitic infection.

Since 1906 it has been utilized in medicine throughout the world. It has been of inestimable value to the clinician both as a diagnostic and therapeutic agent; its importance has been realized in psychiatry, affording us more corroborative and definite information relative to the causative factors of some mental disorders, more particularly general paralysis of the insane. The frequency of the occurrence of a positive reaction in the serum or cerebro-spinal fluid varies greatly with different workers, in fact the discrepancy has been so wide as to some times discredit the value of such a reaction.

In our examinations of 137 general paralytics the Wasserman reaction was found positive in the blood serum in 71% of the cases, and the same reaction positive in the cerebro-spinal fluid in 76%. In glancing over the statistics of various workers recently I believe our results are about uniform.

Relative to the variability of the intensity of the reaction in different phases of the disease no definite relationship between the intensity of the serum reaction and the stage of the disease can be established. As regards the effect of mercury on the Wasserman reaction in general paralysis no change can be reported by us. Wasserman, Citron, Berling speak of the impossibility of converting a positive into a negative reaction with large doses of mercury in general paralysis. As regards the effect of "606" upon cases of general paralysis more data are needed.

In conjunction with the examination of the blood serum of the general paralytic for the Wasserman reaction, it was concluded

to ascertain how prevalent such a reaction was to be found in the blood-serum of the wife, children and near relatives of the general paralytic. To obtain blood for such examination requires considerable diplomacy, the wife or relative very often regarding the procedure with suspicion. Then, on the other hand, sometimes the relatives of patients suffering from general paralysis knowing that we were making tests, have requested that an examination of their own blood be made for the benefit of themselves and their children.

The following shows percentage of frequency of this reaction. Of 19 wives of general paralytics 12 gave positive reaction. Of 3 husbands of general paralytics 1 gave positive reaction. Of 13 children of general paralytics 11 gave positive reaction. Mothers of 3 male general paralytics all gave negative reaction. Fathers of 4 male general paralytics 2 gave positive and 2 negative reaction. Two brothers gave negative reaction, 1 positive reaction. Two sisters gave negative reaction, 1 positive reaction. There was no visible manifestation of syphilis present in any of the above mentioned cases, save one sister who showed old iritis, one wife hemiplegia. The husband of a female paretic has since been admitted, suffering from general paralysis.

It occurred to us that possibly some definite serum reaction might be developed along the lines of the Wasserman reaction, or complement fixation method, utilizing the bacillus paralyticans as an antigen instead of the usual syphilitic liver extract.

As a result of continual observation of the b. paralyticans and its constant presence among general paralytics it was determined that an effort be made to ascertain something further through serology as to its relation to general paralytics, their families and other types of mental disorder.

The original Wasserman method was followed, using an emulsion to the bacillus paralyticans as an antigen. With this method the blood serum of the wives of 10 general paralytics of this series were examined six gave positive reaction (60%).

Of 2 husbands of female general paralytics 1 gave positive reaction. Of 42 general paralytics 36 gave positive reaction (90%).

Of 27 other types of insanities 8 gave positive reaction (30%). Of 16 nurses examined who were thrown in contact more or less

with general paralytics and chronic insane, two gave positive reaction (12½%).

The blood serum of 130 prostitutes, the selection being made from different cities in the state, were next examined; of this number 92 gave positive reaction (70%). It was also observed relative to the prostitute, that such reaction did not occur in prostitutes who had been in the business under 1½ years.

In the cerebro-spinal fluid of 9 general paralytics the reaction was found in 6 (70%). In four other types of mental disorder the reaction was found positive in one case (25%).

Résumé:—1 The Wasserman reaction as a diagnostic agent is of great value in the diagnosis of general paralysis.

2 A positive Wasserman reaction in the cerebro-spinal fluid, even in the absence of well defined mental symptoms, is almost always indicative of general paralysis.

3 A positive Wasserman reaction was found in the blood serum of the wives of general paralytics in 60% of the cases examined; in the blood serum of the children a positive reaction was found in 84% of the cases examined.

On looking at the results of the reaction utilizing the bacillus paralyticans as an antigen, a striking similarity is noticed.

1 A positive reaction is found in the blood serum of the wives of general paralytics in 60% of the cases examined.

2 Among general paralytics this reaction is found in 90% of the cases examined.

The blood serum of the prostitute gives a positive reaction in 73% of the cases.

The results above noted would probably lead us to the conclusion that general paralysis is not due to syphilis alone, at least not as usually described, but that we have in addition a special, and up to the present time, unrecognized and undescribed venereal infection probably entirely distinct from syphilis.

ON CERTAIN PROBLEMS PRESENTED BY CASES OF GENERAL PARALYSIS WITH FOCAL SYMPTOMS.*

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General paralysis presents many problems both to the clinician and to the pathologist. The clinician meets these problems at every stage of the disorder, and a merely casual review of their nature would already bring us into contact with almost every other important group of mental disorders. Even where the diagnosis is clear, the meaning of the various elements in the clinical picture, and the reason of the great variety in the relative prominence of the individual symptoms are quite obscure. The differential diagnosis of general paralysis in its incipient stages from certain functional psychoses, from conditions due to exhaustion or to the action of various poisons, is not always easy; in the later stages it may be extremely difficult to differentiate between general paralysis and other organic dementias arising on the basis of cerebral syphilis, brain tumor, cerebral arteriosclerosis, senile brain atrophy, etc. In the clinical picture of the organic dementias focal symptoms frequently play an important rôle, and in this communication I propose to discuss some points with regard to the focal symptoms in general paralysis.

Focal symptoms may be present in a case of general paralysis without there being any evidence of a direct relationship between the cause of the focal symptoms and the general paralysis; this is, for example, what is found in certain cases with traumatic lesions. I may refer to a case of general paralysis with complete anosmia, recently observed in the clinical service of the Psychiatric Institute. The anosmia was due to the destruction of the

* Read at the sixty-seventh annual meeting of the American Medico-Psychological Association, Denver, Col., June 19-22, 1911.

olfactory lobes by a fall in the hunting field, which occurred thirty years before the onset of the general paralysis.

In cases with traumatic incidents the situation is not always so clear as in the patient with anosmia of traumatic origin. One of my patients had on two occasions a rather severe injury in the period of the insidious onset of general paralysis; on the second occasion there was evidence of fracture of the base of the skull, followed by a traumatic delirium. In the clinical picture which the patient presented under observation, aphasic symptoms and weakness of the right side were present in addition to the physical symptoms of general paralysis. At the autopsy there was found some cortical softening in the peri-sylvian region, but even after microscopical study of this area it was difficult to say what rôle had been played by the trauma and by the general paralysis respectively in its causation.

I have mentioned these cases merely to indicate the general range of the topic, and shall pass now to cases where the focal symptoms are more intimately related to the general paralysis. They may be related only indirectly to the general paralysis, inasmuch as they have their origin in the same syphilitic infection; they may be related very directly to the general paralysis and be due to the special severity of the paralytic process in definite regions of the cortex (Lissauer's atypical paralysis).

I shall begin with a case of a very familiar type. The patient, a janitor, at the age of 33 had a left-sided hemiplegic attack without loss of consciousness; the attack left slight permanent weakness of the left side. Nine years later the insidious onset of general paralysis began, the disorder ran a typical course and the patient died at the age of 45. The post-mortem examination disclosed the typical histopathological changes of general paralysis; in addition there was endarteritis obliterans, with aneurysmal dilatation and occlusion of the cerebral vessels which had caused a sub-cortical softening in the region of R. F. 3.

A hemiplegic attack at the age of 33, in the absence of valvular heart disease or any general infection may in the majority of instances safely be attributed to a syphilitic disorder and usually arises on the basis of an endarteritis obliterans (Heubner's type). In the present case the autopsy confirmed this view. We had to deal therefore with a case of general paralysis which, at an earlier

period, presented evidence of syphilitic cerebral vascular disease. In view of the fact that general paralysis seems only to occur in patients who, at a long antecedent date, have had syphilis, it is not at all to be wondered at that at an earlier period the brain, its vessels or its membranes, should be affected by the syphilitic poison. In such a case the neurological history of the patient is divided into two periods separated by a long interval of time; the incidents of the early period seem to have little to do with the history of the later period, and the evolution of the general paralysis seems in no way influenced by the residuals from the earlier period. At each stage the diagnosis was clear to the clinician; the pathologist could easily demonstrate two processes side by side—the special type of degeneration of the larger vessels, and the characteristic histopathological changes of general paralysis.

The situation is not always so clear as in the above case, and the history of the following patient shows an evolution in which the different stages are by no means so clearly delimited.

The patient, a journalist, had a chancre in 1898, for which he was treated during a period of 6 months; in 1901 he had diplopia, which improved under potassium iodide. In April, 1902, he had an attack of weakness of the left side, which came on during a period of 24 hours, without loss of consciousness; the diagnosis of cerebral syphilis was made. The patient improved under treatment with potassium iodide. In November, 1902, he had a second attack of left-sided weakness, with transitory inability to speak, but without loss of consciousness. He received hypodermic injections of mercury, and also took sodium iodide; under this treatment he improved. During the following three years he suffered from occasional headache, and in 1905 he was unable to keep his position. He complained of increasing weakness in the left leg, he fell on more than one occasion; he complained that his memory was failing. From January to August, 1906, he was in a hospital where he had vigorous antisyphilitic treatment; he received as much as 390 grains of potassium iodide daily, he was also treated with hypodermic injections of mercuric salts. During this period he had convulsions on several occasions; he was sometimes restless and noisy, he wanted to take a stroll along the river, he had hallucinations of hearing, and was apt to ramble on about imaginary things.

In August, on admission to the clinical service of the Psychiatric Institute, he was childishly happy, affable, loquacious, amused by details. He admitted that he had no grounds for his euphoria, and said that he had "not a damn'd cent"; as to his physical condition he said "it's a terrible plight—I don't suppose I will ever get well again"; he laughed cheerfully at the situation. The patient complained of his memory being poor, but was able to give a connected account of his life; he made several careless mistakes, but was able to correct these as a rule. He said that the interval between the two admissions to the N. Y. Hospital on the occasion of his hemiplegic attacks was 18 months, when as a matter of fact it was only six. He was very much confused over the incidents of the immediate past, confused his present environment with the hospital from which he had come.

Physical status: left-sided hemiplegia, not involving the face; no sensory disorder; the left knee-jerk was more exaggerated than the right; tremor of hands and face; the pupils, equal but irregular, reacted well to light and on accommodation; the speech was tremulous and sticking, but without any distortion of the words even in difficult test phrases; the writing was extremely tremulous, the words were crowded up into one corner of the paper, but were correctly written. Ten days after admission the patient had a series of convulsions, with special involvement of the right side, leaving some weakness of the right arm and marked paraphasia; he died 12 days later.

The cortex showed the characteristic histopathological changes of general paralysis; there were several foci of softening, one involving part of R. F. 1, of R. F. 2, and of the upper fourth of R. A. C, another involving the head of the left caudate nucleus and the anterior fourth of the putamen on the left side; foci of softening were also found in the marrow of the left occipital lobe and in the pons. There was well-marked endarteritis obliterans.

In this case the clinical history does not divide itself into such distinct periods as in the previous case, but seems to present the evolution of one process in which no definite line of demarcation can be drawn. There is not, as in the previous case, the long incubation period intervening between the first series of neurological incidents and the later onset of a process of a different kind. In the present case the clinical picture of brain syphilis passes insidiously

and without any long incubation period into that of general paralysis. The whole course of the disorder, its early incidence after the initial infection, the nature of the early symptoms, viz., diplopia, headache, hemiplegic attacks, and in the later period the absence of grandiose ideas with the retention of fair insight into his physical decline and into his defective memory seemed to indicate brain syphilis; the euphoria was a somewhat striking feature, but we know that it frequently is found in cases of brain syphilis; the memory defect, in its setting of a certain mild confusion and difficulty of orientation, could not be considered pathognomonic of general paralysis. At the beginning, therefore, the process appears to have been that of brain syphilis as evidenced by the close relation to the initial infection, by the symptomatology, by the pathological evidence of endarteritis obliterans with consequent focal softenings, while at the end there was no doubt about the process of general paralysis, as evidenced by the typical histopathological changes in the cortex.

At what stage in the evolution of the patient's sickness did it take on the serious character associated with the progressive changes of general paralysis? After all we must remember that we have no grounds for maintaining the unitary nature of the changes in general paralysis. Thanks to the researches of Nissl and Alzheimer we have a definite histopathological criterion which enables us to group our cases uniformly according as they do or do not satisfy that criterion. That this criterion is not the essence of the process is evident from the fact that Nissl found the same histopathological changes in the cortex of a dog and two rabbits. The importance of the histopathological criterion is that it enables us to start from a homogeneous group when we discuss the subject of general paralysis, and that it makes possible a common understanding. The meaning of these histopathological changes is quite obscure, and Nissl himself has raised the question whether they represent a unitary process or whether certain elements in the pathological picture many not be a direct syphilitic manifestation, while other elements may represent a process of a different type.

In the clinical history of the foregoing case we face a series of incidents and a development which become more intelligible if conceived as the expression of more than one process, one pro-

cess not merely succeeding the other, but having its own evolution side by side with the other.

The difficulty of coming to a decision as to whether a case is one of general paralysis or of brain syphilis is further exemplified in the following case; the clinical history was in many respects similar to that of the previous case, no final clinical diagnosis could be made, the autopsy disclosed multiple gummata in the brain.

The patient, a janitor, 47 years of age on admission, contracted syphilis in 1891, at the age of 33; in the summer of 1900 he had strabismus of several months duration. In September of the same year he had an attack of dysarthria and staggering; in September, 1901, weakness of the right leg developed, his speech was somewhat defective. From this time on he had residual weakness of the right leg and during the following two years he had several attacks or right-sided weakness with involvement of speech; on one occasion he was said to have had an attack of weakness of the left arm. In July, 1905, he had an apoplectiform attack followed by a stuporous condition and delirium of several weeks duration, which led to his admission to the hospital in August. In October he developed transitory left-sided ptosis. At that date his physical status was as follows—weakness of the right face, arm and leg; on both sides sign of Babinski and ankle-clonus; left internal ophthalmoplegia; the right pupil reacted slightly to light, well on accommodation; fundi normal; the speech was slurring, slightly sticking, without omissions or transpositions, but with the occasional insertion of *r*; the writing was tremulous with omissions and distortions, *e. g.*, "methis espical" for methodist episcopal, "bittililery" for artillery; lymphocytosis of the cerebro-spinal fluid. Particular attention was paid to an analysis of the mental state of the patient as the diagnosis was a matter of considerable doubt. On admission he was a trifle excited and pugnacious, but soon settled down to a condition of placid good humour; he said that he was happy, felt first-rate; he did not resent being with crazy people; he knew the date, called the place "Manhattan Life Insurance—Bellevue Hospital." He gave a rather poor outline of his life with marked discrepancies in his dates. He had no adequate realization of his general condition. During his hospital residence his mood continued

to be one of exaggerated complacency with a tendency to whimper when talking of home. He felt that he could resume his old work, but showed no megalomanic trend. This mild euphoric dementia, with the type of memory defect presented by the patient, pointed in the direction of general paralysis, and the nature of the writing defect seemed to support this diagnosis; the neurological history with its varied incidents seemed to point more in the direction of cerebral syphilis. We have, however, already seen from the preceding case that such a neurological history is not incompatible with the development of general paralysis. The unilateral ptosis with complete fixity of the left pupil was the most definite evidence of cerebral syphilis; in the preceding case, however, diplopia had been one of the earliest symptoms.

The autopsy showed general cloudiness of the pia, frontal atrophy, ventricular granulations; there was a gumma in the left centrum ovale, another in the right parieto-occipital fissure; an old softening of vascular origin was found in the right internal capsule and thalamus, another in the left side of the hind-brain involving the pyramidal tracts; the larger vessels showed a definite endarteritis obliterans. The cortex showed preservation of the general structural arrangement; there was no diffuse plasma-cell infiltrate. The meninges showed a syphilitic meningitis of varying grade with slight extension into the cortex; this is a form of syphilitic disorder to which Dr. Dunlap has especially called attention, and which approaches most closely the condition found in general paralysis.

If I have reported these two cases in somewhat tedious detail, it is because I feel that the difficulty of differentiating clinically between general paralysis and cerebral syphilis is not sufficiently realized; it is true that certain symptoms have considerable value in pointing very strongly in one direction or in another, but we must recognize that in a certain number of cases, even after the most careful weighing up of the various symptoms, the only honest course is to withhold a diagnosis until the microscopical examination enables us to definitely classify the case.

These considerations are still valid notwithstanding the introduction of new methods into psychiatric procedure. It has been hoped that an infallible laboratory method might enable us to

dispense with tedious clinical arguments. The introduction of the Wassermann method marks an important advance in our knowledge of general paralysis; it gives us direct evidence of the connection of general paralysis with syphilis, a connection which previously had merely the support of statistical evidence. It does not, however, always solve our clinical problems, and simply furnishes one more datum to be taken into consideration in weighing up the evidence with regard to the diagnosis. That it is difficult, even with the help of the Wassermann reaction, to determine the exact stage of the evolution of the disease in the individual case may be seen in the following case:

Gennaro P., a wood-carver, had syphilis at the age of 19; at the age of 40, in December 1907, he had an apoplectiform attack with residual left-sided weakness. After this attack he was inefficient at work, treated his wife outrageously, and finally was certified as insane. On admission he presented slight weakness of the left side, Argyll Robertson pupils, no defect of speech nor of writing, no tremor of the fingers; the cerebro-spinal fluid showed lymphocytosis and increased globulin; both the blood-serum and the cerebro-spinal fluid gave a positive result with the Noguchi modification of the Wassermann reaction (Dr. Henderson). The mental state of the patient was one of mild complacency with slightly inadequate realization of the gravity of the situation; his memory was slightly defective.

In such a case we are entitled to attribute the hemiplegic syndrome to a syphilitic endarteritis, although certain reservations on this head must be made later. Argyll Robertson pupils are not frequently found in cerebral syphilis and point much more strongly towards general paralysis. As to the Wassermann reaction it is just in such a case that we realize its limitations, for although the positive reactions increase the probability of the case being one of general paralysis, the possibility of cerebral syphilis is not excluded. The necessity of basing conclusions with regard to the differential value of the Wassermann reaction on material that is controlled by autopsy, is obvious in the light of cases such as those which have been briefly referred to.

The discussion of the above cases has shown how closely the question of the focal symptoms in general paralysis is bound up with the problem of the fundamental nature of the disorder and of its relation to syphilis.

In a paper on arteriosclerosis in relation to mental disease

read before this association at a meeting in Washington (May 8, 1907), I made a brief reference to a patient, the diagnosis of whose case was a matter of great difficulty. The patient had begun to fail at the age of 45; from that date his memory became progressively worse; at the age of 58 he had a general convulsion. During the following two years he showed progressive mental decline and a variety of neurological incidents. In view of the absence of knee-jerks, the presence of the sign of Romberg, a well-marked lymphocytosis of the cerebro-spinal fluid, the diagnosis of tabes dorsalis was made. In view of a permanent right-sided hemiplegia and right-sided sign of Babinski, with numerous transitory left-side attacks the additional diagnosis of advanced arteriosclerosis of the basal vessels with focal softening in the left occipital region was made.

The mentality of the patient throughout his stay in the hospital was that of "the lean and slipper'd pantaloon"; he was amiable and mildly jocose, but at no time showed definite euphoria and never uttered any ideas of grandeur. The writing of the patient showed very marked tremor and great distortion of the words. The reaction of the pupils to light became more and more sluggish during his stay in the hospital; the speech was extremely slurring, but did present the features which are so characteristic of general paralysis. The possibility of general paralysis was considered, but it was felt that there was not sufficient evidence to make a positive diagnosis of general paralysis. The autopsy seemed to confirm the clinical diagnosis; the vessels of the base of the brain showed a very extreme degree of diffuse thickening and the left visual cortex was destroyed by a large area of softening due to the occlusion of a thickened artery; the pia was not markedly thickened and the brain showed a rather diffuse mild degree of atrophy. In addition to the damage due to defective nutrition resulting from vascular thickening, symptoms had been caused directly by the pressure of thickened tortuous vessels; the right optic tract was reduced practically to a ribbon by the pressure of the adjacent posterior cerebral artery.

On microscopical examination the typical histopathological changes of general paralysis were found. The necessity of microscopical examination before making any final statement as to the nature of such a case is here well shown, for the autopsy gave no

dispense with tedious clinical arguments. The introduction of the Wassermann method marks an important advance in our knowledge of general paralysis; it gives us direct evidence of the connection of general paralysis with syphilis, a connection which previously had merely the support of statistical evidence. It does not, however, always solve our clinical problems, and simply furnishes one more datum to be taken into consideration in weighing up the evidence with regard to the diagnosis. That it is difficult, even with the help of the Wassermann reaction, to determine the exact stage of the evolution of the disease in the individual case may be seen in the following case:

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On microscopical examination the typical histopathological changes of general paralysis were found. The necessity of microscopical examination before making any final statement as to the nature of such a case is here well shown, for the autopsy gave no

indications of general paralysis. The anatomical evidence enabled one to see that in this case, as in the other cases already referred to, for a considerable time there had been going on side by side the evolution of two processes, the process of general paralysis on the one hand and on the other hand various changes due to disease of the larger vessels.

In a certain number of cases of general paralysis with focal symptoms the latter are due to the special severity of the paralytic process itself in definite regions of the cortex; such cases were described by Lissauer under the heading atypical paralysis, in contrast with the classical type of general paralysis, where the greatest severity of the process is in the prefrontal and frontal region and where focal symptoms of motor or sensory nature are absent. The paralytic process in such cases is most marked in the posterior half of the cortex, the degree of destruction is more pronounced than in the classical form, secondary degenerations can be demonstrated in relation to the affected areas; the clinical course of these cases shows certain characteristics, it is apt to be a less uniform decline than in the classical form, and to consist rather in a descent by steps, the downward steps usually corresponding to a series of attacks; the total course is apt to be longer than in the classical type, and the clinical picture frequently presents considerable difficulty in diagnosis. Between the atypical general paralysis of Lissauer and the classical type all transition forms can be found.

To the pathologist and the clinician these cases furnish extremely important problems, but in this communication I shall merely have time to take up one or two points. A case which has just recently come to autopsy is worth reporting in this connection. The long duration of the case, the stationary nature of the symptoms, the keenness of the patient and the absence of any memory defect made the diagnosis of the case extremely difficult.

The patient was a man of 37, who had followed a variety of occupations, from jockey to machinist, and been temperate in the use of alcohol; at the age of 26 he had a chancre, for which he received treatment during one month. Four years later he began to suffer from pains in the back and chest, accompanied by nausea and vomiting; during the next six years he continued to have these pains.

At the age of 34 he had a transitory episode of weakness and numbness of the left side; two years later he was diagnosed "incipient locomotor ataxia." At that time he presented Argyll Robertson pupils, diminution of the knee-jerks, slightly tabetic gait, tenderness over the hypogastrium. In the following year he began to show a grandiose trend, he wished to take his physician for a carriage ride, he talked of plans for working a patent, wished to move into a better house, he asked a girl in a store to marry him and knocked her hat off when she refused. Owing to this behavior he was certified as insane.

On admission he was talkative and elated, said that he was worth $90,000, the patent was worth over 3 millions, he was a first-class prize-fighter; the physical status, as then noted, was, Argyll Robertson pupils, knee-jerks decreased, speech defective.

For some months the patient remained megalomanic and somewhat excited, he then became depressed and hypochondriacal; on several occasions he had attacks of vomiting and of severe pain in the side. He had a variety of other attacks; in May, 1903, he had an apoplectiform attack which left him with slight left-sided weakness.

In the following year, in April, he had several convulsive attacks, and it is probable that the hemianopia, which was later observed, dated from this series of attacks.

In the summer of the same year (1904) he had an excited period with well-marked megalomania; he was a millionaire, owned the hospital and the White House, had been 9 million years on earth; "I am McKinley, I'm greater than God Almighty, I own the world and have got billions upon billions of dollars."

This megalomanic condition lasted for several months and then simmered down; during the following year (1905) he showed definite depression with a marked hypochondriacal trend; his detention was unjust, his lungs and heart had been knocked out of him, his food was doctored so that his bowels did not move, nothing ever passed out of him. At the same time the patient showed excellent grasp of all relations not touching his own condition.

During 1906 there was little change in the patient's general condition, he had occasional convulsions and periods of weakness, he said that his bowels were stopped up by poison in the food,

there was steam in the bed, the mattress was charged with electricity. He did not elaborate his depressing delusions into any system; at times he was unable to resist shouting out these accusations, but at other times he would spontaneously criticize himself for this abuse, and admit the possibility that he was mistaken; perhaps the bed was not magnetized, perhaps it was merely his nerves, he might be slightly crazy; "the devil must have got into me yesterday saying such crazy things—I was calling people murderers, I must stop that, it's nonsense."

He would pay a daily visit to the physician in his office and ramble on about his experiences in life; although he would frequently refer to his unjust detention and to his morbid ideas he did not press the physician for his discharge; he would pass abruptly from bitter complaint to good-humored gossip about life in hospital and at home, he commented with much shrewdness on his fellow-patients and discussed newspaper topics in an intelligent manner. He was pleasant and humorous in his conversation, and took considerable pleasure in recounting his exploits in the past. His memory was extraordinarily good; he remembered all his transfers during his hospital residence and could give correctly the number of each ward in which he had been. He made light of his physical ailment and felt sure that he could easily earn a living; fresh air and city doctors would cure him, he could get a job as night watchman, could make money as an entertainer, could publish a book of his experiences.

The physical status in July, 1906, was as follows; residuals of a left-sided hemiplegia, slight weakness of the left face, arm, leg, sign of Babinski on the left side, impairment of sensibility on the left side, left-sided hemianopia, athetoid movements of left hand, marked ataxia of left arm and leg. The knee-jerks, diminished in 1901, were now definitely exaggerated, the right being occasionally more active than the left (due to spastic condition of the left leg). Argyll Robertson pupils; nystagmus in lateral vision, general diminution of pain sense; sign of Romberg; speech somewhat slurring, without tremor, sticking or distortion of words; writing, tremulous with marked distortion of the test words, *e. g.*, "mthosit espisocpil" (methodist episcopal); marked lymphocytosis of the cerebro-spinal fluid.

During the following five years until the time of his death the

patient showed remarkably little change either in his mental or in his physical condition. He had occasional periods of depression, but as a rule was bright, alert, interested in the newspaper and in hospital affairs; a very careful examination of his memory, in 1910, showed that, apart from one or two trifling lapses, his memory was still excellent. He still talked with confidence of his own abilities, and claimed to have personal influence with the Governor; his hypochondriacal complaints were unchanged and he had a number of poorly elaborated delusions. In his physical condition there was little change, the writing was rather better than in previous years, although he distorted one letter and wrote "thrird" for third. The cerebro-spinal fluid showed a marked lymphocytosis with positive globulin reactions, but negative Wassermann (Noguchi's modification); the Wassermann (Noguchi) reaction with the blood-serum was positive (Dr. Henderson).

The patient during the latter years had a series of attacks of a somewhat peculiar nature; immediately after the attack he would be quite clear and remember every detail up to the onset of the attack. He made light of these attacks, and frequently had occasion to say, "I'm no paretic."

On May 28, 1911, the patient, at 7 a. m., had one of these apoplectiform attacks and fell heavily on his head, causing a subdural hæmorrhage; when examined at 9 a. m. he made light of the attack, protested against being detained in the hospital, stated accurately to a day how long he had been detained. Ten minutes later he became unconscious, during the rest of the day there was marked twitching of the right side of the body; the patient died at midnight without regaining consciousness.

The difficulties presented by such a clinical history are obvious. The prodromal period with apparently tabetic symptoms, the gradual onset of an elated and megalomanic condition, the periods of florid megalomania, the pronounced hypochondriacal trend, seemed to indicate general paralysis, a diagnosis which was further strengthened by the presence of Argyll Robertson pupils and the special defect in writing. The hemiplegic syndrome—left-sided weakness, impairment of sensibility, hemianopia, with athetoid movements of the left hand, suggested in addition the presence of a focal softening involving the posterior limb of the capsule, the

optic radiations and the optic thalamus; the athetoid movements of the left hand indicated the involvement of the optic thalamus.

It was somewhat difficult, however, to reconcile the diagnosis of general paralysis with the striking preservation of the memory of the patient, and with the lack of progression of the symptoms.

At the autopsy a large recent sub-dural hæmorrhage was found over the right hemisphere; this, however, only partly accounted for the contrast between the flattened right hemisphere and the well-rounded convolutions on the left side. The right hemisphere showed a very considerable degree of atrophy in comparison with the left hemisphere, the convolutions were narrower, and although the sulci were not specially wide, this may have been due to the recent hæmorrhage. The pia did not show any definite thickening; there was no special atrophy of the frontal lobes; no granulations in the 4th ventricle were seen by the naked eye. The basal vessels were in good condition except for a patch of thickening in the right internal carotid just at its bifurcation.

On a horizontal section which passed just at the upper limit of the optic thalamus on the left side and slightly above it on the right side, the right hemisphere presented a very marked diffuse atrophy of the medullary substance, with no focal lesion; the cortex did not present any very marked difference on the two sides.

Another section was made just below the level of the middle of the thalamus on the right side without any focal lesion being found. The pons showed hæmorrhagic infarction. Numerous blocks were taken from the cortex for microscopical study and the brain was placed in Müller's fluid to be later cut in serial sections.

The microscopical sections showed the typical histopathological changes of general paralysis, which were more marked on the right side than on the left; the pia showed an exudate of plasma-cells and lymphocytes; the general structure of the cortex was disorganized, with considerable loss of nerve cells; there was a diffuse peri-vascular plasma-cell infiltrate throughout the cortex.

I do not intend to discuss the numerous problems which arise in regard to this case. I wish to emphasize one point which it demonstrates, viz., that in a case of general paralysis, of ten years' duration, with the process much less marked in the left than in the right hemisphere, the memory may remain practically intact and the general mentality of the patient may show very little evidence of progressive reduction.

The case again warns us to be careful in the use of clinical material which is not controlled by autopsy, and illustrates the value of the modern histopathological criterion. It makes us accept with reserve cases published before the last decade, for the classification of this case, even with the help of the microscopical findings, would have been extremely difficult before the publication of the work of Nissl and Alzheimer.

The fact that we correlate the left-sided syndrome with the right-sided cerebral atrophy does not mean that we have any adequate understanding of the disorder; the correlation is of a rather crude kind, and we are far from understanding the intimate mechanism of the clinical symptoms. We are equally far from understanding the factors which lead to the definite topographical distribution of the severity of the paralytic process. It is certain, however, that it cannot be explained on the basis of lesions of certain cerebral vessels, for the distribution does not as a rule correspond with vascular territories, and the microscopical examination of the vessels frequently fails to show any alteration sufficient to account for the particular severity of the cortical disorder.

The fact that a pronounced right-sided cerebral atrophy may be accompanied by such a moderate degree of mental reduction is of considerable interest, and in this context I should like to briefly mention another case, presenting several features in common with that of the patient already reported.

The patient, 47 years old at the time of his death, a tabetic general paralytic, had been over 3 years in the hospital, he had been definitely insane for 4 years before his death, he had shown slight mental symptoms for at least 9 years before his death. He had numerous left-sided attacks, with a permanent left-sided syndrome—hemiplegia, hemianæsthesia, hemianopia.

No focal softenings were found in the brain post-mortem, but the convolutions of the right hemisphere were extremely shrivelled, and furnished a striking contract with those of the left hemisphere. The patient, however, at the time of his death was very far from presenting the extreme degree of mental reduction which is found in many patients, whose brains show nothing like the degree of atrophy shown by the right hemisphere of this patient. The description of one of his attacks, two years before death, may be of interest in this connection. On August 12, 1907, the left arm and leg began to twitch, without involvement of the face. There was

no impairment of consciousness; he was talkative, referred spontaneously to the twitching, said that he was certainly going to die in the evening. He wanted to go home and settle up his household affairs. "I know I am dying, I want to speak with my three children, to be good to the mother when I am no more. I am very sorry if I must die, I will be 45 on Christmas (correct), do for me what a poor man, a dying man, expects, put me in two blue blankets and in the ambulance, want to die with my woman." The twitching in this attack lasted for two days.

The lucidity of the patient during such an attack, with symptoms due to some active process in the right cerebral cortex, and the fact that his mental reduction later was not extreme while the right cerebral cortex showed an extreme degree of shrivelling, leads us to ask how far the degree of dementia has to be correlated more strictly with changes in the left cerebral hemisphere and not so much with the cerebral atrophy as a whole.

From this point of view it will be of interest to pay particular attention in our cases to the relative involvement of the two sides of the brain and to see whether this may help us a little further in our work of clinico-anatomical correlation.

In concluding I should like to call attention to one group of cases of general paralysis with focal symptoms, the consideration of which should prevent too premature an interpretation of the relation of clinical symptoms to the pathological findings. I refer to that group of cases where even a conscientious and systematic examination of the brain reveals no focal softenings, no focal exacerbation of the process of general paralysis, in short nothing which we can correlate with the clinical symptoms.

Out of a series of twenty cases of general paralysis with focal symptoms, in 6 there was no pathological evidence of any focal disorder; in another case with a permanent hemiplegia, which had been diagnosed previous to admission as thrombosis of the internal capsule, no lesion of the internal capsule was found, nor did the motor cortex on the suspected side show any definite difference from that on the other side. There are limits, of course, to our technical methods and an examination can never cover absolutely exhaustively the territory suspected, but the lesson from these cases is, perhaps, that we must learn to think in more functional terms of these symptoms, especially where we are dealing with focal symptoms of a transitory nature.

The points which I have desired to call attention to in this communication are as follows:

Summary.

1. Cases of general paralysis may present focal symptoms which are more or less irrelevant to the general paralysis, *e. g.*, focal symptoms of traumatic origin.

2. Cases of general paralysis may present focal symptoms, which are based on a process which has a common origin with the general paralysis, *e. g.*, symptoms due to softening on the basis of a syphilitic endarteritis.

3. The evolution of a case, which at an early stage presents evidence of syphilitic vascular disease, into a case of general paralysis may be more or less rapid and the clinical picture may represent a combination of more than one process.

4. The exact stage at which the onset of the general paralysis has begun is extremely difficult to determine, even with the help of modern serological methods.

5. The clinical picture alone is sometimes insufficient to enable a positive diagnosis to be made, the autopsy itself may not be decisive, the microscopical examination of the cortex is essential for a decision.

6. The pathological criterion of certain histopathological changes is invaluable, but the relation of these changes to the disease process is quite obscure.

7. Focal symptoms in general paralysis may arise on the basis of localized severity of the paralytic process.

8. In one case reported, of ten years' duration, there was remarkably little mental reduction, but the paralytic process especially involved the right hemisphere.

9. The relation of dementia to the right and left hemispheres respectively is a problem of interest, the study of which may further clinico-anatomical correlation.

10. In many cases of focal symptoms in general paralysis the examination of the brain reveals no adequate cause for the focal symptoms; this should warn one against being satisfied with the crude correlation of the lesions, which we do find in other cases, with the clinical symptoms, seeing that the latter may sometimes be found in the absence of such lesions.

Notes and Comment.

DEMENTIA PRÆCOX REGALIS.—That insanity is no respecter of person is a well understood axiom. There are, however, only a few cases of mental disease in the history of royalty, and these, on account of their prominence, always excite interest, though definite data are wanting for the analysis of the symptoms of patients whose private lives and personal peculiarities are so completely protected from the public gaze.

An exception to this rule lies in the description of the insanity of King Charles VI, of the House of Valois, whose long reign from 1380 to 1422 was troubled out only by the wars and intrigues of that medieval time, but also by the serious defects brought about by his mental disease. Fortunately for medical history, a clear account of his symptoms is given by Froissart. Sir Walter Scott probably owed much to this great chronicler, and in attesting his indebtedness and the vividness of his dramatic representation of the history of the days of knight-errantry says:

> The figures live and move before us; we not only know what they did, but learn the mode and process of the action, and the very words with which it was accompanied. This sort of colloquial history is of all others the most interesting. The simple fact that a great battle was won or lost makes little impression on our mind, as it occurs in the dry pages of an annalist, while our imagination and attention are alike excited by the detailed description of a much more trifling event. In Froissart, we hear the gallant knights, of whom he wrote, arrange the terms of combat and the manner of the onset; we hear their soldiers cry and their war cries; we see them strike their horses with the spur; and the liveliness of the narration hurries us along with them into the whirlwind of battle. We have no hesitation to say that a skirmish before a petty fortress, thus told, interests us far more than the general information that twenty thousand Frenchmen bled on the field of Crécy. This must ever be the case, while we prefer a knowledge of mankind to a mere acquaintance with their actions; and so long also we account Froissart the most entertaining, and perhaps the most valuable, historian of the middle ages.

Scott might have paid a similar tribute to Froissart's clinical description, for the account of the insanity of the king is not less vivid.

When the king was about twenty years of age, he was seized with a burning fever, the duration of which is not fully determined, but he is said to have fully recovered from the attack. Shortly afterwards he became worried over some differences in his court, and again became feverish and was unfit to ride. His physicians announced that he was oppressed with too much business and that rest and quiet were absolutely necessary, and then ascribed his indisposition to the effects of the initial attack of fever. The king became greatly exercised over some disputes with the Duke of Brittany, and, in the face of the protests of his physicians and his court, insisted upon entering upon a campaign. In the summer of the year 1391, when the king was in his twenty-third year, "he labored hard and assiduously in the council, and was besides not perfectly recovered in health." He was "feeble in mind and body, scarcely eating or drinking anything, and almost daily attacked with fever which was increased by any contradiction or fatigue." His physicians and uncles noticed that at times his intellect was deranged, but they could not do anything with him, nor would he on any account defer the expedition. The events of this expedition are described by Froissart in the following graphic terms:

As the king was passing through the forest of Mans, a strange accident happened to him: a man, bareheaded, with naked feet, clothed in a jerkin of white-russet, rushed out from the trees and boldly seized the reins of his horse, saying, "King, ride no further, but return; for thou art betrayed." The men-at-arms beat the man off, and he escaped; but his speech made such an impression on the king's mind that his understanding was shaken. He and his army passed on; it might be about twelve o'clock when they were clear of the forest. The heat and dust were most oppressive. The king rode by himself, and the Dukes of Berry and Burgundy kept on his left at no great distance; two of his pages also followed him. As they were riding, the pages, who were but children, grew negligent of themselves and their horses; the one who bore the king's lance fell asleep, and let it fall on the casque of the page before him, which made both the lance and casque ring loudly. The king was startled and alarmed, for he had in his mind the words of the man whom he met in the forest of Mans, and fancied a host of his enemies were come to slay him. In this distraction of mind he drew his sword, for his senses were quite gone, and advancing on the pages, he gave blows, indifferent on whom they fell, bawling out, "Advance, advance on these traitors." He then made up to the Duke of Orleans, who was not far off, and the duke, seeing him approach, and the state he was in, spurred his horse and made off, but the king followed him. All were in the greatest amazement, and knew not

what to do! at last, when quite wearied out from fatigue, a Norman knight, called Sir William Martel, came behind the king and caught him in his arms, by which means he prevented further mischief. The other lords then came up and took his sword from him, and having undressed and cooled him as gently as they could, they laid him on a litter and carried him slowly to Mans. . . . . The king was carried to Creil, and put under the care of four knights and his physicians. The men-at-arms were disbanded and sent home, and it was strictly forbidden the queen's household and all others, under pain of being severely punished, to mention this misfortune to the queen, who was far gone with child.

At this time there was a learned physician in France, a friend of the Lord de Coucy, who had not his equal anywhere. His name was Master William de Harseley, and he had fixed his residence in the city of Laon. On first hearing of the king's disorder and the cause of it, knowing, as he thought, the king's constitution, he said, "This disorder of the king proceeds from the alarm in the forest, and by inheriting too much of his mother's weak nerves."

In a church at Haspres, in Hainault, dependent on the abbey of St. Vast at Arras, lies the canonized body of St. Aquaire, in a rich silver shrine. The saint is celebrated for the cures he has performed on those afflicted with madness, and on that account is much visited from all parts. To pay due respect to the saint, there was made a figure of wax, resembling the king, which was sent thither with a large wax taper, and offered with much devotion at the shrine of the saint, that he might pray to God to alleviate this cruel affliction of the king. A similar offering was made at St. Hermier, in Rouais, who has the reputation of curing madness; and wherever there were saints supposed to have efficacy by their prayers to God in such disorders, thither were sent offerings from the king with much ceremony and devotion.

The king continued to reside at Creil, under the charge of Master William de Harseley, who was very attentive to him, and by little and little restored him to health. He first got rid of the fever and great heat he complained of, and then brought back to him his appetite, sleep, and recollection of things about him. Until he was strong enough to bear the removal for change of air, he allowed him to ride, hunt, and amuse himself with hawking.

The king of France had every year relapses of his frenzy, without any physician or surgeon being able to prevent them. Some, indeed, boasted that they could restore him; but his disorder never ceased until it had run its course, in spite of prayers and medicine. A strong suspicion was about this time excited that the king had been poisoned or enchanted by some pernicious herbs, and that the Duchess of Orleans, daughter to the Duke of Milan, was the cause of the mischief, that she might succeed to the crown of France. The Duke of Orleans was very melancholy on hearing such injurious report against his duchess; and Galias, Duke of Milan, her father, felt the disgrace so deeply that he twice or thrice sent ambassadors

to France to exculpate his daughter to the king and his council, at the same time offering a knight or knights, who should engage in mortal combat any person who should dare to accuse his daughter of such iniquitous and treasonable practices. Moreover, on account of this accusation he himself threatened to make war on France.

Charles VI died October 22, 1422, in the fifty-fourth year of his age. Froissart probably died several years before this, so that we are not informed with the same fidelity to detail of the later life of the king. It is probable, however, that the attacks of mental indisposition occurred at frequent intervals, and proved an embarrassment not only during the outbreaks but in the intervening periods when the danger of excitement and responsibility must have been felt to seriously embarrass the administration of the government. In fact, this uncertainty as to the moods of the king had much to do with the disturbances of the State, and for about thirty years the kingdom was distracted by the rivalry of the dukes of Burgundy and Orleans, who lacked the controlling hand and wisdom and superior power of the king. M.

AUSTRALASIAN MEDICAL CONGRESS.—The ninth session of the Australasian Medical Congress, held at Sydney from September 18th to 23d, 1911, appears from the proceedings, as far as they have been published, to have been an exceptionally vigorous congress of physicians.

The activity of the section of psychology and neurology was noticeable, and a rather novel plan of arousing interest was followed in that contributions to the various topics of discussion were invited from different parts of the world. The contributors were not required to make the long journey, but forwarded their papers, and these were presented by the officials of the section in their proper place in the program. Provision for the insane, for the feeble-minded and for epileptics had a very prominent place. The session opened with a discussion on "Treatment of Mental Patients in General and Special Hospitals without Certification," and this brought out many interesting statements concerning the early management of mental disease. The participants were: Dr. Ernest Jones, Inspector-General for the Insane for Victoria; Dr. Montgomery, Inspector-General of Western Australia; Dr. Downey, of South Australia; Dr. Mosher, of Albany, N. Y.; Dr.

Eric Sinclair, Inspector-General for the Insane for New South Wales; Dr. A. W. Campbell, of Sydney, and others.

It appears that a vigorous effort is being made throughout Australia to meet the need of patients in the early stage of disease. Dr. Jones for Victoria, reported that difficulties had been met in efforts to induce the general hospitals of Melbourne to set aside wards for the early treatment of mental disease, and legislation is being sought in that colony to enable voluntary patients to be admitted into a mental hospital; and for the present it is desired that early cases should be notified to the department so that assistance may be provided by way of a nurse or attendant to care for the patient at his home. In Western Australia two wards have been erected at the Perth Public Hospital, and the patients are under the care of the visiting medical staff, men attendants being provided by the lunacy department, and women patients being cared for by the nurses of the hospital. Two hundred and sixty-one patients have been admitted to these wards, of whom one hundred and nine have been discharged recovered, so that the encouragement given by these results is about to lead to similar provision in other hospitals.

In Adelaide, South Australia, it is proposed to open a mental ward in the general hospital, where patients will be admitted on the same terms as to other departments of the hospital. Dr. Downey, in discussing this matter, pointed to the necessity of providing in every hospital for the insane a special building for the treatment of new admissions, this building to be separate from the main building, so that recent and curable patients could be treated quite apart from the chronic and incurable, as is now planned and generally adopted in New South Wales. Dr. Eric Sinclair has elicited the opinions of general practitioners, and from the few responses to his inquiries derived the impression that the great majority of medical men in general practice, no matter at what stage the disease exists, recognize all mental conditions in the same light, and, therefore, recommend the same treatment for the incipient as for the well established. Dr. Sinclair described the work in the reception houses of Sydney and New Castle in New South Wales, where during 1910 1289 patients were treated, of whom 55.8% were certified and 44.2% were discharged.

Jails are still in use in some of the larger county towns, and though provided with nurses from the lunacy department of the colony are not satisfactory. In the ward on the grounds of the reception house at Sydney, an experimental course of treatment is being carried out for patients before certification, and here the patients are admitted in the fullest sense voluntarily, the management being on the lines of a general hospital. The general sense of the discussion as expressed by other members was in favor of early, liberal and untechnical arrangements for the care of incipient mental cases.

Dr. Fishbourne, of Melbourne, opened the discussion on the "Segregation of the Epileptic and Feebleminded," and advocated the adoption of colonies on the cottage system for sane epileptics, with educational provision for children, and also recommended institutions of mixed cottage and institution form for insane epileptics, thus relieving the hospitals for the insane, and at the same time providing proper care and protection of this special class of patients. Dr. Fishbourne also had in mind the economic question of preventing the perpetuation of a feeble, helpless, half-witted population by intelligent segregation.

He was followed by Dr. E. M. Stevens, of South Australia, who, after a world tour, emphasized the need of proper distinction in the classes of feebleminded, approved Dr. Bishop Harman's method of estimating the standard of the defective child, and wished to see a separation of children suspectible of improvement and education from the evil influences of helpless cretins, other idiots and imbeciles.

Dr. Harvey Sutton, of Melbourne, also emphasized these propositions, and after expressing his approval of the Binet method urged industrial and farm colonies.

It appears that this question of provision for the feebleminded is an urgent one in the various colonies of Australia, and some definite action is evidently needed. The question was opened by a contribution by Dr. Andrew Davidson, the secretary of this section of the congress, in a contribution to the *Australian Medical Gazette*, published shortly before the sessions of the congress, in which Dr. Davidson emphasized the pronounced heredity of these defectives, and of criminals and inebriates, showing that a considerable number are at large, and he bases an appeal for improvement

in these conditions in Australia upon these facts, and also cites the work of Dr. Paget and Miss Dendy, of England, whose conclusions were summarized in the JOURNAL of last July.

Another symposium of this section was upon the Freud doctrines, and the congress was fortunate in the presentation of contributions from the leading exponents of this method of mental examination. Professor Freud contributed a description of the principles of his work "On Psycho-Analysis"; Dr. Jung wrote, "On the Doctrine of Complexes," and Dr. Havelock Ellis presented a critique upon "The Doctrine of the Freud School."

Among other topics was the presentation of a paper on "Neurasthenia," by Dr. Clifford Allbutt, and a paper "On the Practical Significance of the Use of the so-called 'Four Reactions' for the diagnosis of Syphilitic Organic Nervous Diseases" by Dr. M. Nonne. Dr. Nonne's contribution will be available in the proceedings of the congress, but his conclusions may be of immediate value. He discusses the technique of lumbar puncture and of the Wassermann reaction in detail, and announces the relative values of the examination of the blood and of the cerebro-spinal fluid. The typical finds are as follows:

1. *General Paralysis or Tabo-Paralysis.*—(1) Wassermann reaction in the blood positive (almost 100 per cent) pressure of cerebro-spinal fluid often increased.

(2) Phase I reaction positive (in about 85 to 100 per cent).

(3) Lymphocytosis (in about 95 per cent).

(4) Wassermann reaction in the cerebro-spinal fluid.

(a) Positive in 80 to 90 per cent after the original method (0.2 cc. of fluid).

(b) In 100 per cent by using larger quantities.

2. *Tabes (without combination with paralysis).*—(1) Wassermann reaction in blood serum positive in about 70 per cent. Pressure of cerebro-spinal fluid often increased.

(2) Phase I reaction positive in about 95 per cent.

(3) Lymphocytosis in about 90 per cent.

(4) Wassermann reaction in the cerebro-spinal fluid.

(a) After original method (0.2 cc. positive in 5 to 10 per cent).

(b) With larger quantities positive in almost 100 per cent.

3. *Cerebro-spinal Syphilis.*—(1) Wassermann reaction in blood serum positive in about 80 to 90 per cent. Pressure of cerebro-spinal fluid frequently increased.

(2) Phase I reaction, only in exceptional cases, negative, otherwise positive.

(3) Lymphocytosis, like Phase I, almost exclusively positive.

(4) Wassermann reaction in the cerebro-spinal fluid.

(*a*) With original method (0.2 cc.) positive in about 10 per cent.

(*b*) With larger quantities of fluid almost always positive (of special value for the differential diagnosis as against multiple sclerosis).

It thus appears that "a closer study of this tabulated summary shows that the use of even all four reactions does not yet solve all the questions as to diagnosis of the diseases of the central nervous system. It is even possible that the result of the serological, cytological, and chemical examination of blood and cerebro-spinal fluid may be misleading. For instance, it happens in some few cases that the blood of a general paralytic shows negative Wasserman reaction, and that in a pronounced tabetic all four reactions are negative; this seems most likely to occur in chronic old standing cases, and in hereditary tabes. While it has never occurred in the Nonne ward that the Wassermann reaction in the cerebro-spinal fluid of a paralytic was negative by using larger quantities of fluid, cases of cerebro-spinal syphilitic arteritis have repeatedly shown a total absence of fixing elements in the cerebro-spinal fluid. I need not discuss again the possibility of a combination of a non-specific disease of the central nervous system with a specific one, whether stated in the history or not. Owing to the stated sources of error, of which there still exist many, it follows that even if one uses all four reactions, one has still to use the greatest critical caution in diagnosis. If the observer does not wish to run the risk of grave diagnostic errors he has still to apply a careful and detailed clinical examination in each individual case, working hand in hand with the more modern methods. Some skeptics and critics have already sarcastically remarked that the pivot of medical examination lies, now-a-days, in the laboratory; but this is by no means correct. On the other hand, we may say, after some years of careful and

conscientious testing of the modern methods of examination, that by their complete mastery and their logical and critical application we have obtained an excellent aid towards the diagnosis of the affections of the central nervous system, especially of the syphilitic ones."

The last paper to be mentioned in this exceptional collection of highly scientific contributions is that upon "The Relation of Head Injury to Nervous Mental Disease," by Dr. F. W. Mott, Pathologist to the London County Asylums. This is a large and often complicated and uncertain topic. Dr. Mott describes the various functional and organic effects of traumatism, and his judicial summary of the various questions, both medical and legal, may be regarded as representing the present state of these problems.

Taken all in all, this Australasian Congress gives indication of having been most rich in its contributions to the practice and theory of psychiatry. At this long distance, it appears to the editors of the JOURNAL that to the energy and far-sightedness of the officers of the section may be attributed the success and value of their meeting.

Book Reviews.

The Conquest of Nerves. By J. W. Courtney, M. D. (*New York: The MacMillan Company, 1911.*)

In this book the author first discusses various popular healing cults, such as Christian Science, the Emmanuel Movement, and New Thought, which naturally leads him to a consideration of Charlatanry in General. He describes how these methods of treatment help or injure the nervous patient and in his description gives a fair, impartial view of the subject.

He then, in succeeding chapters, discusses the Nature and Causes of Functional Nervous Disorder, The Bodily Symptoms, The Mental and Emotional Symptoms, The Physical Treatment, and The Psychotherapy of the same. The same fair and impartial attitude is preserved, and the author succeeds in demonstrating that functional nervous disorders are usually cured by the education of the patient by the physician who arouses the faculty of *self-help*, and so promotes recovery.

It is a book that can safely be given to intelligent patients, at certain periods of their disorder, to arouse in them this faculty of self-help, or to combat a desire for some of the above more spectacular methods of treatment. It is carefully written in a clear and simple style which makes it easy to understand. It is free from any animus, and its fair statements cannot but convince any but the most prejudiced reader. In certain cases its perusal will save the physician a vast amount of time which he would otherwise have to spend in clearing away doubts or mistaken ideas which the patient may have acquired, and will put the patient in a more receptive condition for the treatment which the physician is giving. The book is a small one, of about 200 pages, which the patient can read in a comparatively short time.

W. R. D.

Traité International de Psychologie Pathologique. Edited by Dr. A. Marie. Collaborators, Bechterew, Clouston, Dégerine, Grasset, Lugaro, Magnan, Pilcz, Raymond, Ziehen. Vol. II. Psychopathologie Clinique. (*Paris: Félix Alcan, 1911.*)

The second volume of this exhaustive treatise deals with the practical side of psychiatry. The editor defends the materialistic attitude maintained in Vol. I (Psychopathologie Général), and insists upon the extended application of the viewpoint of psychophysical parallelism in the resolution not only of the so-called psychoneuroses, but also of the disturbances primarily psychic. Recognizing no satisfactory scheme of classification, the editor reviews some of the more important nosologic tendencies from

the historic viewpoint, and presents the following arrangement of chapters: Neuroses and Psychoneuroses (Raymond); Psychic Disturbances in Organic Nervous Diseases (Bechterew); General Paralysis (A. Marie and Lhermitte); The Dementias (Ziehen); Precocious Dementias (Deny and Lhermitte); Degenerative States and Psychopathies (Sollier, Roubinovitch, Colin, and Bourilhet); Chronic Systematised Delusional Psychoses (Magnan, Sérieux and Capgras); Maniaco Depressive Psychosis (Bagenoff, Pilcz; Infection Psychoses (Pilcz); Mental Confusion (Régis and Hesnard); Intoxication Psychoses (A. Marie and Riche).

The neuroses and psychoneuroses are discussed by Professor Raymond who died shortly before the appearance of this second volume. The term psychoneurosis he would restrict so as to include only two diseases, hysteria and psychasthenia, as being the expression of hereditary or constitutional pre-disposition, in other words manifestations of degeneracy. Thus the neurasthenic-syndrome is divided, all the complex cases, originally described by Beard, being included under psychasthenia; while the neurasthenic complex proper, mostly an acquired condition of adult life, is confined within the limits first set by Charcot.

Kraepelin, to whom more than to any other the agitation of the dementia präcox question has been due, was desired to write the chapter on this disease, but felt obliged to decline, in view of the more or less radical modification of his conception of dementia präcox, to be presented in the eighth edition of his text-book. The three types recognized by Kraepelin are retained, the classification being improved, however, by the fusion of the hebephrenic and katatonic varieties. The scheme is perhaps somewhat needlessly enlarged by the separate consideration of a so-called *simple form*. It is with justice pointed out that the prognosis in true dementia präcox is exceedingly unfavorable, and that while "social" restorations are possible, the so-called cures are evidence of simple remission or diagnostic error.

The protean malady *confusion mentale* is still retained, and has been assigned a separate chapter, although appropriately narrowed to include only certain toxic-infectious states. Even so it is heterogeneous enough, Some overlapping of description is inevitable in a collaboration like the present work, and while there is instruction in a comparative perusal of the discussions, *e. g.*, of dementia präcox and chronic mental confusion, such an exercise might hardly leave clear images in the mind of the student.

A third volume, including discussions of applied and comparative psychopathology, laboratory methods, prophylaxis, etc., will complete the series. FARRAR.

Abstracts and Extracts.

The Recognition of the Pre-neurasthenic and Pre-insane Condition in the Young. A Study for the General Practitioner. By Ross Moore, M. D. Journal of the American Medical Association, Vol. LVII, p. 2079. December 23, 1911.

The author in beginning states two problems: First, does neurasthenia develop on a neural soil which should be recognized as such in early life? Second, are there certain types of children that furnish victims of insanities, of the dementia præcox, or manic-depressive and hysterical groups which are clear enough to be described and recognized?

Simple and efficient tests enable us to estimate the grade of deficiency existing in the blind, deaf and crippled, the idiots, imbeciles and infantiles, those mentally subnormal or retarded, and the morally abnormal. From none of these classes come the mental cases suffering from such mental troubles as dementia præcox, mania, melancholia, and hysterical insanity. These future sufferers spend their childhood among normal people and are generally considered normal.

From a study of the literature and of case histories the author has isolated three rather distinct types which he calls the pre-neurasthenics, the pre-emotionals, and the pre-dements.

"Natural juvenile neurasthenia is clear cut. Its symptoms are as follows: On the physical side, a general droopiness, poor standing balance, diminished expression in face, fulness under eyes indicating fatigue, other fatigue signs, as when the arms are extended, one is lower than the other and thumbs droop, twitching fingers, abdomen thrown forward when trying to stand erect; on the nerve side, marked inability to accomplish, due to mental not physical fatigue, a mental apathy more apparent than real, abnormal sensibility to external impressions, such as sudden noises, etc.

"The pre-emotional type shades into and is often combined with the neurasthenic type. Children of the latter type are usually well formed physically, while those of the pre-emotional type may show various physical stigmata of degeneracy."

The distinguishing features between these two types is their response to stimuli, the neurasthenic responding most readily to external, and the pre-emotional to internal. Fear, ambition, love, hate, sorrow provide internal reasons for outward reactions which at times become so prominent as to be labeled "unnatural."

The pre-dements are the mental shut-ins, who physically well-built are apparently happy and care-free, yet often, carry a hazy and terrifying

knowledge of their own apartness from their associates. They have power to follow out their natural aptitudes with brilliancy, thereby covering up defects in their reasoning power and intellect, which may be immense.

The key to the pre-neurasthenic type is fatigue. The key to the pre-emotional type is instability. The key to the pre-dement is internal strife. It is believed that these types can be studied and clarified so that teachers and family physicians may learn to recognize them as they now do the abnormal child. W. R. D.

Transitory Mental Confusion and Delirium in Old Age. By CHARLES W. BURR, M. D. Journal of the American Medical Association, Vol. LVII, p. 2117, December 30, 1911.

This is a report of six cases of transitory mental confusion or delirium, two of which died without being restored to mental clearness. Two of the other cases were restored to clearness in 24 hours, one after an hour, and the other after several weeks. All but two cases showed evidence of Bright's Disease, in three combined with arteriosclerosis. One case had had an obsession for some time which is believed to have been the cause of the confusion. The other had an attack of speechlessness followed by jargon-speech probably due to a partial thrombus, as she later had two attacks of right hemiplegia and partial motor aphasia. It is believed that transitory mental confusion or delirium rarely occurs in the aged without there being arteriosclerosis and kidney disease. W. R. D.

Chronic Alcoholism: What Can and What Cannot be Accomplished by Treatment. By GEORGE E. PETTEY, M. D. Journal of the American Medical Association, Vol. LVII, p. 1744, November 25, 1911.

Chronic alcoholism is a disease, and in many instances springs from other diseases. It is also certain that other diseases grow out of it. These may be physical, mental, or moral. Drinkers may be classed as regular or periodic. For the last there are four types of causes: (1) dipsomania, real or symptomatic; (2) moral cowardice; (3) bad environment, with lack of stability of character; and (4) bad environment, with an ever present but usually successfully resisted appetite for liquors. The last is the one most amenable to treatment.

In treatment, the first and most important step is thoroughly to cleanse the system from the products of waste which the effects of alcohol have forced it to retain. The bowels, kidneys, and skin should be made to do many times their ordinary duty. As the toxic matter disappears the nervous system becomes quiet and the urgent demand for the effects of alcohol disappear. Usually in the course of three or four days alcohol may be withdrawn, but not until the system is prepared for it. After this point is reached the treatment varies according to the cause or set of causes. If they are purely mental, the patient is to be treated as a mental case. If they are moral and social, efforts should be

made to direct the patients future life so as to protect him from damaging influences. Proper therapeutic measures should be used to overcome the catarrh of the stomach, and baths, electricity, and physical exercise may be used with advantage. The time required for a cure varies from two weeks to two months. W. R. D.

The Anatomy of Spinal Puncture with some Considerations on Technic and Paralytic Sequels. By WILLIAM C. LUSK, M. D. Annals of Surgery. Vol. LIV, p. 449, October, 1911.

This is an excellent study of the lower spinal cord and deserves the attention of all who practice lumbar puncture. After a consideration of the anatomical relations, comment is made upon the various accidents, such as paralyses, which have followed lumbar puncture. From these studies it is concluded that "the only vertebral interspaces through which puncture of the subarachnoid space can be made with practical assurance that nerve structure will not be penetrated, are the fourth lumbar and the lumbo-sacral, preferably the former. This presupposes the employment of a correct technic." W. R. D.

A First Study of Inheritance of Epilepsy. By CHARLES B. DAVENPORT and DAVID F. WEEKS, M. D. Journal of Nervous and Mental Diseases, Vol. 38, p. 641, November, 1911.

This is en elaborate study of the pedigrees of the inmates of the New Jersey State Village for Epileptics, and but little can be done in abstracting it in limited space as it contains so many tables and charts. From the conclusions given it may be stated that epilepsy and feeblemindedness show a great similarity of behavior in heredity, supporting the hypothesis that each is due to the absence of a protoplasmic factor that determines complete nervous development. Persons suffering from migraine, chorea, paralysis, and extreme nervousness usually carry some wholly defective germ cells and may be termed "tainted." When such a tainted individual is mated to a defective about one-half of the offspring are defective. When a simplex normal is mated with a defective about half the offspring are normal; the others defective or neurotic. When both the parents are either epileptic or feebleminded all their offspring are so likewise. The most effective mode of preventing the increase of epileptics that society would probably countenance is the segregation of all epileptics during the reproductive period. W. R. D.

ERRATA.

The following errata in Dr. Fuller's article in the JOURNAL for October, 1911, should be noted:

Page 147, Section II of Contents, *for* "Spirotrichia" *read* "Sphærotrichia."

Page 150, last line, *for* "Aufbau" *read* "Abbau."

Page 195, 3d line of Section VIII, *for* "8 of microcephalic idiocy" *read* "1 of microcephalic idiocy."

Page 204, 5th line from top, *for* "eight of the plaque cases" *read* "nine of the plaque cases."

Page 210, 11th line from the bottom, *for* "8 of the cases" *read* "9 of the cases."

Page 213, reference 1, *for* "Bd. 2" *read* "Bd. 3."